

Demographic Factors for the Management of Forest Landscapes in the Velingrad Area

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Summary:

This paper presents an analysis of the results obtained by work on the International Scientific Project for *Future-Oriented Management of Forest Landscapes* – INTEGRAL. The demographic situation in the Velingrad area is analysed in the 1956 - 2013 period in the fields including: the number of the population; the gender and age structure, the proportion of urban and rural population. The demographic development in the Velingrad municipality is compared to the demographic development in the Pazardzhik district and in Bulgaria. The results are generalised by SWOT analysis.

Key words: demographic situation, management, forest landscapes, Velingrad, Bulgaria, INTEGRAL.

JEL Classification: Q23, J11, R58

1. Introduction

The demographic situation in a given region is very important for the development of business (Kolev, 2010;

Paligorov, 2001, 2002, 2009; Stipcov, 2000). It could have stimulating or de-motivating effect on entrepreneurial activity (Paligorov and Balgarenski, 2002). The evaluation of the population in fields such as age, sex, education and etc. shows the current and potential condition of human resources in terms of quantity and quality.

The aim of the present research is to investigate the impact of the demographic factors on the management of forest landscapes in the Velingrad municipality by analysing the demographic situation and the demographic processes. The object of research is the case study area Yundola, which is part of the Velingrad Municipality. The data set are obtained from the National Statistical Institute and covered the 1956 - 2013 period.

2. The methods and objects of research

The study of the impact of the demographic factors on the management of the forest landscapes in the Velingrad area was conducted by statistical data processing and forecasting the demographic structure. Methods of analysis used in the paper are

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based on statistical data processing. The assessment of the demographic indicator trends in Pazardzhik and Velingrad was carried out by regression analysis.

The area is located in the south-western part of Bulgaria. This region of immense physiographic and biological diversity includes a broad spectrum of vegetation and natural sightseeing and phenomena. It is mainly woodland landscape with forests in all parts of the area (about 90%). There are very productive coniferous forests. Agricultural landscapes are presented by meadows located near the village of Yundola and the other surrounding villages. The whole forested area belongs to the Experimental Forest Department "Yundola" and is managed by the University of Forestry in Sofia as an outdoor educational and research facility (Galev, 2012a; 2012b, Stipcov et al., 2007).

town centres – Velingrad (population about 25 000) and Belovo (population about 4 000). The villages of Yundola, Saint Petka and Pashovi are located in the case study area. The codes by the NUTS classification related with the Velingrad municipality are presented in Table 1.

Its territory is located on both sides of the border between the Rila and Rhodope mountains and is in the form of an irregular polygon with a length of 10 km from east to west and width of 6 km from north to south. The overall configuration of the terrain around the village of Yundola forms an open "valley" oriented with its long axis from the northeast to the southwest.

The majority of the area (56.2%) is located on the shady exposition, where the northern exposure is (19.5%). Sunlit expositions occupy about half of the area

Table 1. The codes by the NUTS classification related with Velingrad municipality

Level	Codes	Description
NUT 0	BG	Bulgaria
NUTS 1	BG4	Yugozapadna i Yuzhna Tsentralna Bulgaria (South-West and South Central Bulgaria)
NUTS 2	BG42	Yuzhen tsentralen rajon za planirane (South Central Statistical region)
NUTS 3	BG423	Oblast Pazardzhik (Pazardzhik District)
LAU 1	PAZ08	Obshtina Velingrad (Velingrad Municipality)

The Experimental Forest Department Yundola is located on the boundary between two Bulgarian mountains (Rila and Rodopi). The forests at the case study area are managed continuously by forest management plans that are valid for a decade. Current land use planning is generally consistent with the multipurpose forest management and with the conservation and sustainable development of forest landscapes in the modern socio-economic conditions.

Case study area Yundola is located in the Pazardzhik region around two local

(43.8%), while the majority is located on the southern (14.8%). These features of the terrain influence the distribution of light and heat, soil moisture and fertility, and other environmental factors, and hence the formation of different types of habitats.

More than 50% of the area is situated on the slopes, and 32.9% are steep. Many steep and vertical terrains occupy 7.1% of the area. It largely determines a favourable terrain for logging, afforestation and construction of roads.

The road from Velingrad to Razlog passes through the area, and the asphalt

roads that connect Yundola with the town of Belovo and with Belmeken too. Five forest roads and many other shorter routes cover almost the entire territory. Existing road network is sufficient to ensure lumbering and logging activities on the Forestry.

Table 2 shows the structure of the types of areas. Most of the municipality is

Table 2. Approximate area distribution of the landscape

Types of Areas	Area (ha)	% of Area
Area of Interest	5900	100%
Experimental Forest Department Yundola	5200	88%
<i>Including:</i>		
Wooded	4750	80%
Unforested area (glades and others area forestless)	450	8%
Urban area	100	2%
Agriculture area	600	10%
Natural Landmarks	2.1	0.04%
"Pashovi skali"	2.1	0.04%
Protected Landscape Area	349.7	6%
"Valyavitsite"	0.8	0.01%
"Rogachitsa"	126.9	2%
"Arapchal"	220.8	4%
"Laletata"	1.2	0.02%

Areas for development of agricultural production are relatively limited (10 %). Unfortunately they are not used efficiently due to the aging population and the fragmentation of the land area into small fields and meadows.

The distribution of the land by ownership type is summarized in Figure 1. It is evident

represented by areas for forestry purposes. This fact defines the region as an important centre for the development of forestry (Stipcov et al.,2007). Well-preserved forests and beautiful landscapes create favourable conditions for tourism-related activities.

from the data set presented in the figure that there is a variety of the types of property in the municipality. State public property occupies the largest share in the distribution of land by type of ownership (80.30%). Municipal private property occupies 13.08%

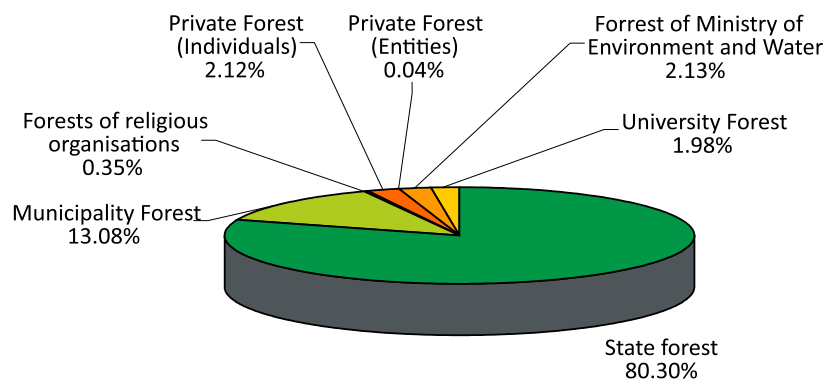


Fig. 1. The ownership area distribution in the Pazardzhik District (2005)

of the municipal territory. Private property occupies 2.16% of the municipal territory. The property of the University of Forestry occupies 1.98 % of territory (Galev, 2012a; Kostov, 2005, Stipcov et al., 2007). Other types of property have smaller shares in the total area of the municipality. Land by type of ownership (80.30%). Municipal private property occupies 13.08% of the municipal territory. Private property occupies 2.16% of the municipal territory. The property of the University of Forestry occupies 1.98 % of territory (Galev, 2012a; Kostov, 2005, Stipcov et al., 2007). Other types of property have smaller shares in the total area of the municipality.

A good motivating factor to engage the stakeholders on a local/landscape level is to achieve the desired mutual cooperation. This would ideally be done in cooperation with other ongoing research projects.

Developing plans for multipurpose forest management is one of the possibilities to engage stakeholders on a national level. The process for Multipurpose Forest Plan development and elaboration on the territory of the Velingrad Municipality has already started. The Plan for multipurpose forest management of the forest on the territory of the municipality of Rakitovo has more than a 7-year history of implementation (Stipcov, et al. 2007).

Developing forest management plans - as a form of scientific organization focused on forests, occupies a special place in the management of processes related to the reproduction and use of forests.

The predominant soil types are Cambisols. Most of the area belongs to loamy-sandy soil texture. There are Fluvisols and Colluvisols in the valleys. In absolute values of preservation of humus

and nitrogen, Mollic Cambisols are the richest, but because they are formed at high altitudes and low temperatures (respectively shorter growing season), the mineralization of organics and microbiological processes are delayed, which ultimately reduces their properties. It is on these soils that the productive spruce plantations in the region are located. White fir can also successfully evolve here. The Humic Cambisols have the best properties associated with plant growth. They are characterized by a significant power humus-accumulation horizon (an average of 32 cm). These soils in the region are strongly acidic.

Currently the erosion occurs mainly in some steep slopes. Therefore, the only measure for soil protection is the prohibition of all activities and grazing, as trees, shrubs and herbaceous vegetation play an important role in erosion.

Species richness of forest stands is essential for the external appearance and recreational attraction of forests (Paligorov et al., 2003, 2004; Stipcov et al., 2007, Galev, 2011). It is analysed in three main aspects. The first is called "common characteristic" and shows the most common features of species composition and differentiates forest stands of pure and mixed type, on one hand, and of coniferous, deciduous, coniferous-deciduous and deciduous-coniferous types on the other - Table 3. Those which have a value of a 9 or 10 percent contribution to the predominant species and account for 36% of the woodland (1,710 ha) are recognized as pure stands. The remaining 64% (3,040 ha) belong to the mixed stands. Furthermore, pure stands are differentiated into coniferous and deciduous depending

on the dominant species (whether it is coniferous or broadleaf tree). Only 1% (14 ha) of the total area of all pure stands accounted for deciduous and 99% (1,696 ha) for coniferous types. Mixed stands are divided into three categories - coniferous, coniferous-deciduous and deciduous-coniferous. The mixed coniferous are composed only of conifers. They dominate the territory and the holding cover 43% (2,040 ha) of woodland and

of Forestry woodland and 2% of the area of all mixed stands.

The second major aspect in the analysis of species diversity is called "quantify the diversity" - Table 4. Pure stands in this analysis are defined slightly differently than those of the previous one. These include only trees that are composed of only one tree species having a value "10" for its participation percentage in the total stock. They occupy 23% (1092 ha) of

Table 3. General characteristics of species diversity of forest stands

4750 ha wooded area=100%				
1710 ha=36%			3040 ha=64%	
Pure stands			Mixed stands	
Coniferous	Deciduous	Coniferous	Coniferous-Deciduous	Deciduous-Coniferous
1696 ha	14 ha	2040 ha	960 ha	40 ha
35.7%	0.3%	43%	20%	1%

67% of the area of all mixed stands. Mixed coniferous-deciduous are these in which the predominant species is a conifer, but also at least one broadleaf species having a percentage contribution are present in the composition. This category occupies 20 percent (960 hectares) of the woodland, and 31% of the area of mixed

woodland. Mixed stands consisting of two tree species occupy the most significant share of the Forestry woodland - 35% (1,677 ha). In plantation consisting of three or more species, predominantly one of them occupy 26% (1,224 ha) and those without dominance - 16% (758 ha).

The following map - Figure 2 shows the

Table 4. Quantify the species diversity of forest stands

Pure stands (composed of one tree species)	Composed of two tree species	Mixed stands	
		Composed of three or more tree species	
		With a predominance of one of them	Without a predominance of one of them
1092 ha	1677 ha	1224 ha	758 ha
23%	35%	26%	16%

stands. Mixed deciduous-coniferous have a predominant tree species belonging to the deciduous trees and also have in their composition at least one conifer species having the percentage contribution. They occupy about one percent (40 hectares)

collaborative or separate presence of much higher trees and single tree species occurring in forest stands. Some generalizations can be made on the basis of the results of these analyses: The image of forest landscapes in the researched area, especially in the visual

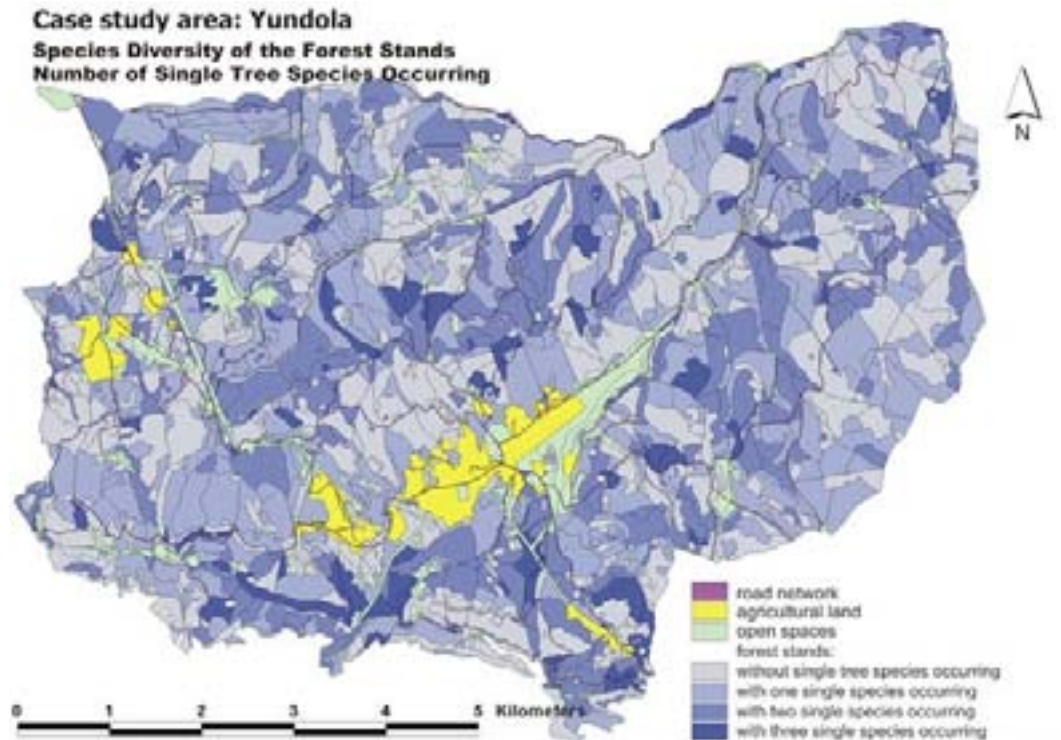


Fig. 2. Map of the species diversity of forest stands

range of the resort is given by pure and mixed conifer stands. It can certainly be argued that the northeast area of the Forestry is characterized by relatively high performance given a variety of species in stands. Less diversity in the species composition in stands placed in areas with higher concentration of open spaces is observed.

Considering the forest resources and services of the area, these forests provide the means of livelihoods of the local population, especially in the field of timber harvesting and timber processing, picking of mushrooms, herbs and berries, and also the region's favourable conditions have stimulated the development of tourism over the last couple of years, and new business activities have been considered focusing

on the production and processing of non-timber forest products.

3. Demographic situation and demographic processes in Velingrad municipality

The main characteristics of the demographic development in the case study area Yundola, which is the part of the Velingrad Municipality, are presented in the Figures 3 to 16.

The total number of population change in the Velingrad municipality, in the Pazardzhik region and in Bulgaria could be seen in different ways including - gender, age, nationality, educational level, the share of people living in urban/rural areas.

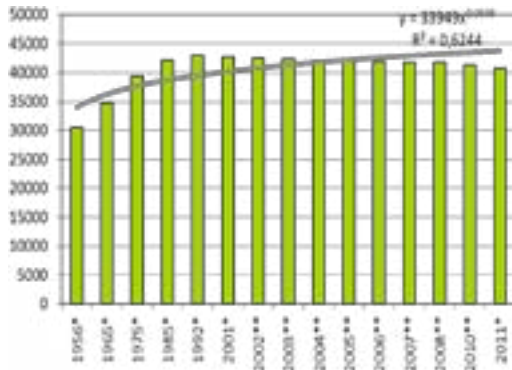


Fig. 3. The number of population of the Velingrad municipally change in the 1956-2011 period – trend of depopulation

Note: * according to censuses, ** as 31.12
Source: National Statistical Institute, Bulgaria

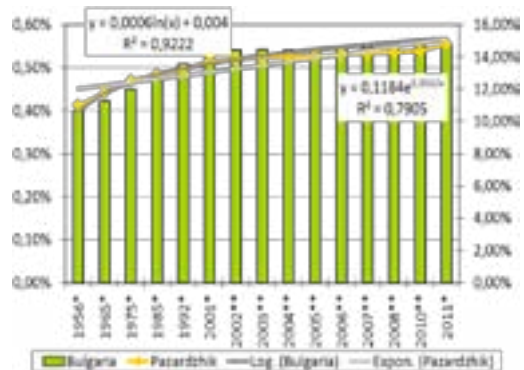


Fig. 4. The share of the Velingrad municipality population change of Bulgaria and Lovech District during 1956-2011 the period by years, %

Note: * according to censuses, ** as 31.12
Source: National Statistical Institute, Bulgaria

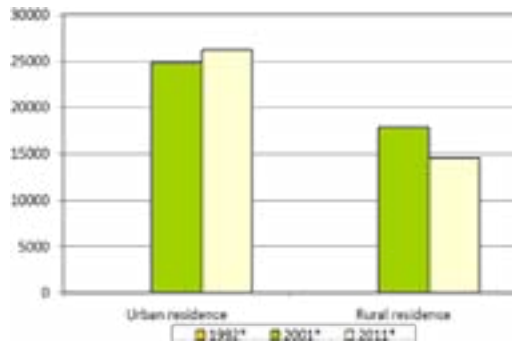


Fig. 5. The number of population change of the Velingrad municipally at place of residence, during the 1992-2001-2011 period

Note: * according to censuses, ** as 31.12
Source: National Statistical Institute, Bulgaria

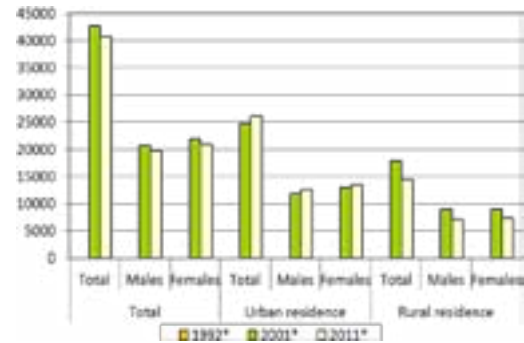


Fig. 6. The number of population change of the Velingrad municipally at place of residence and gender, during the 1985-2011 period

Note: * according to censuses, ** as 31.12
Source: National Statistical Institute, Bulgaria

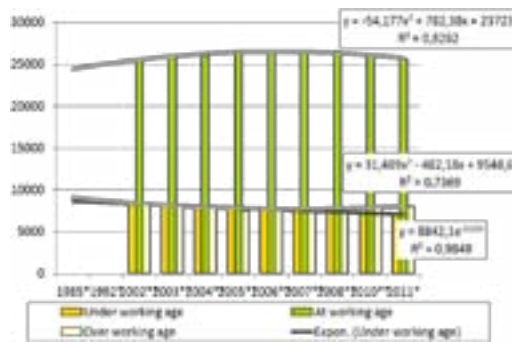


Fig. 7. The number of population change of the Velingrad municipally at working age, during the 1985-2011 period

Note: * according to censuses, ** as 31.12
Source: National Statistical Institute, Bulgaria

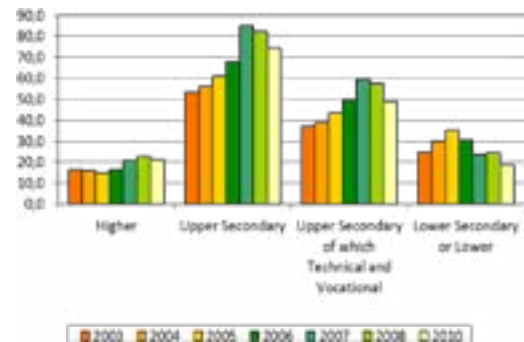


Fig. 8. The number of population of the Velingrad municipally change in working age and sex, during the 1985-2011 period

Note: * according to censuses, ** as 31.12
Source: National Statistical Institute, Bulgaria

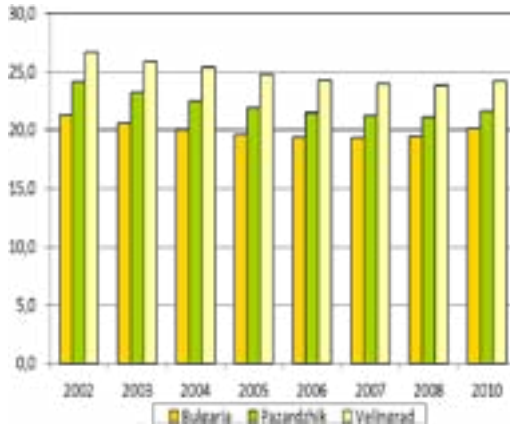


Fig. 9. The age ratio (0-14/15-64) of population change of the Velingrad municipally, during the 2002-2010 period
Source: National Statistical Institute, Bulgaria

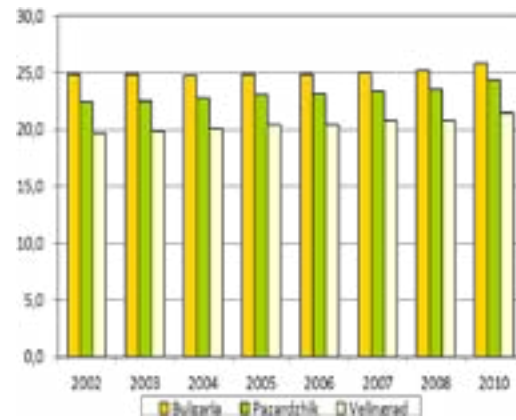


Fig. 10. The age ratio (65+/15-64) of population change of the Velingrad municipally, during the 2002-2010 period
Source: National Statistical Institute, Bulgaria

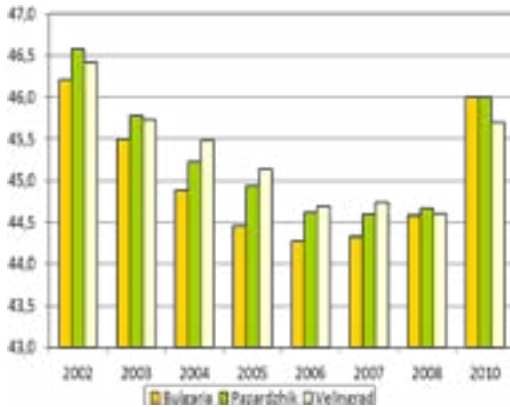


Fig. 11. The age ratio (0-14, 65+/15-64) of population change of the Velingrad municipally, during the 2002-2010 period
Source: National Statistical Institute, Bulgaria

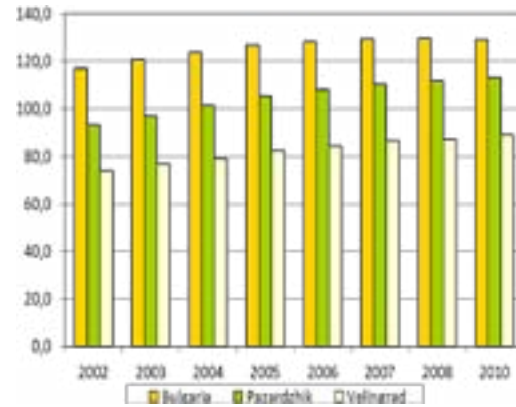


Fig. 12. The age ratio (65+/0-14) of population change of the Velingrad municipally, during the 2002-2010 period
Source: National Statistical Institute, Bulgaria

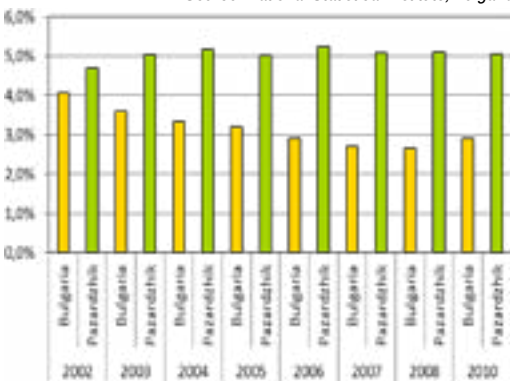


Fig. 13. The share of employees change under labour contract in agriculture, hunting, forestry and fishing from total employees under labour contract during the 2002-2010 period, %
Source: National Statistical Institute, Bulgaria

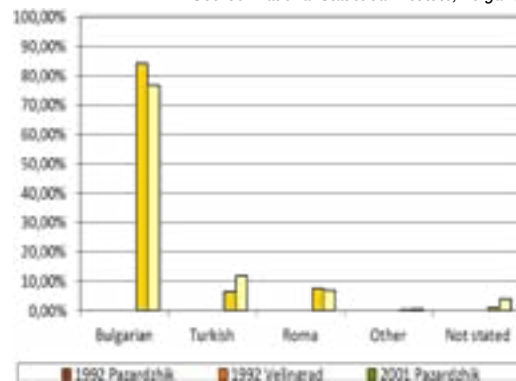


Fig. 14. The share of population by ethnic group
Source: National Statistical Institute, Bulgaria

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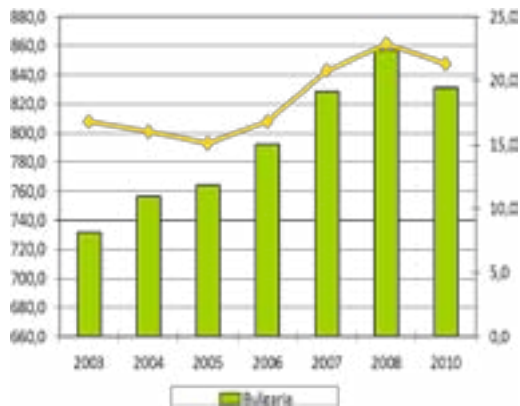


Fig. 15. The number of employed persons with higher level of education change, thousands

Source: National Statistical Institute, Bulgaria

It could be summarised that:

- The population of Velingrad marks a relatively steady growth in the 1956-1992 period and an insignificant decrease in the 1992-2011 period - Figure 3 and Figure 4.
- The process of urbanization of the general population has an impact on the management of the forest landscape - Figure 5 and Figure 6;
- According to the results of interviews, the forest has an important role in the landscape in the Velingrad municipality and Yundola;
- The trend of the depopulation of the rural area of the Velingrad municipality is clear and it is representative for Bulgaria - Figures 9 to 12;
- The gender and ethnic inclusion has affected all economic sectors (Figure 8 and 14) and the immigration phenomenon for the last 20 years has influenced the labour market, which may in turn affect forests and the management of forested landscapes;

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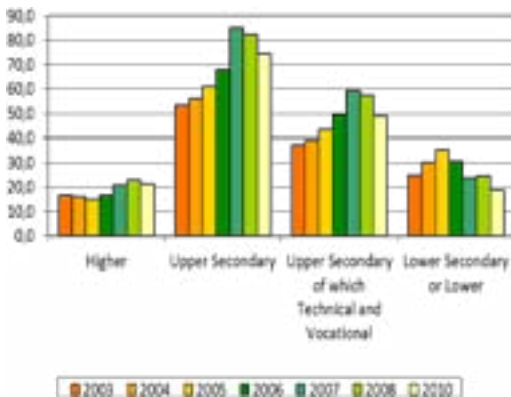


Fig. 16. . The number of employed persons of the Pazardzhik region by level of education change, thousands

Source: National Statistical Institute, Bulgaria

- The changes in the education level of those living in Velingrad are significant and also representative for the region and for Bulgaria - Figures 15 and 16;
- The changes in the population are the same of the forest owners and they have a big influence on forests management.

Table 5 presents the SWOT analysis of the results from statistical data processing.

Some important issues related to the forest management and the impacts of the changes of the demographic characteristics are:

- After the process of restitution in the beginning of 2010, there are more than 300 000 "new" private forest owners (in 1939 they were more than 456 000) in Bulgaria and more than 1 200 000 heirs (after 2 generations);
- The predominant share of the "new" private forest owners receive their ownership documents for their forests, and they do not have any idea how to manage them;

Table 5. SWOT Analysis

Strengths	Weaknesses
<p>High share of the employed persons with higher and upper secondary education and general tendency of increasing in the Pazardzhik district and Bulgaria.</p> <p>Stable ethnic and sex structure with a slight predominance of females over males.</p>	<p>Decreasing of the population. An excessive number of people in post-productive age.</p> <p>Depopulation in rural areas.</p> <p>The ageing index reaches very high numbers especially in poorer rural areas.</p>
Opportunities	Threats
<p>Opportunity for entrepreneurship in forest and agriculture because of natural conditions, natural resources and the professional schools of forestry in Velingrad.</p> <p>Often the young people choose professions related to forestry management.</p> <p>Few of them remain in the region.</p> <p>Young people demonstrate "love" for nature.</p>	<p>Negative trend of changing population age structure in the direction of aging.</p> <p>The process of urbanization of the general population in Bulgaria and the region of Pazardzhik.</p> <p>Young people move from the countryside to the cities or emigrate abroad. Young people demonstrate "love" for nature, but they don't care for it.</p> <p>Reducing the number of skilled workers in the working age.</p> <p>Demographic problems concern all aspects of society and affect the general economy, state planning, labour markets, pensions as well as social and regional development in the case study area and Bulgaria</p>

- More than 30% of the private forest owners live in the big cities, and more than 45% of their heirs also live in the big cities;
- As a result, the forest management of the new small private forests is not organized by their owners and the role of the state forest (hunting) enterprises in the forest management as well as in the planning process increases significantly. Moreover, with the last changes in the Forest Act (2012) the protection and control of the activities in the small-sized private forest plots (under 2 ha) have been transferred to the state forest enterprises;
- According to the INTEGRAL Project results of the interviews, the forests have played an important role in the land-

scape in the Velingrad Municipality for the last 50 years, but the problems with their management is deeply affected by the demand for timber production, recreation and employment.

Conclusion

The results of analysis show that it is possible to manage the migration processes in the region of Velingrad. This will positively affect forest management. The main problem is that the ownership of some forest areas is in the hands of people who are not interested in their management. Another important problem is the illegal extraction of wood. This is due to the low standard of living in the region and the lack of control of an institutionalized authority.

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The identified factors are:

- Excessive number of people in post-productive age.
- Ageing index reaches very high numbers especially in poorer rural areas.
- Demographic problems concern all aspects of society and affect the general economy, state planning, labour markets, pensions as well as the social and regional development in Bulgaria.
- The process of migration of young people of the general population in Bulgaria
- The negative trend of changing population age structure in the direction of aging.
- Depopulation in rural areas.
- Young people are moving from countryside to cities or immigrate abroad.
- Young people demonstrate "love" for nature, but they don't care about nature protection.
- This area has a professional school of forestry. Often the young people choose professions related to forestry management. Few of them remain in the region.
- Reducing the number of skilled workers in the working age.
- Low living standards.

According to the INTEGRAL Project, the results of interviews and on the basis of the secondary data, it can be summarised that the demographic development in the Velingrad Municipality is a hindrance and maybe it will be the hindrance for the management of forest landscapes. The process of depopulation, the increasing average age and the migration of the young

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people to the big cities or abroad are the main reasons for this conclusion. The demographic development influences all aspects of society at the national level (NUTS 1) as well as in the District of Pazardzhik Region (NUTS 3) the Velingrad municipality, so it has impact also on the forestry and management of landscapes forest.

Acknowledgement

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