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The Spatial Transformation of the Urban Environment in the Conditions of Post Industrial Development of Society: Dedicated to the 100th Anniversary of Jean Gottmann, Immanuel Kant Baltic Federal University, 23-26 August 2015, Russia.

## Land Use, Settlement, and Modern Landscapes

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### ABSTRACT

The paper summarizes main factors influencing the look of contemporary regional landscape, i.e., the system of land use management and settlement patterns that are organically shaped by the region's geological structure and terrain. The case in question - The Kaliningrad region - has seen its fair share of redrafting of administrative and state borders over the past century. Not only that: This territory, largely devoid of natural contrasts, has experienced dramatic shifts in economy, settlement systems, and ethnic composition of its population, - all of which is reflected in the way the regional landscape is presented today.

**Keywords:** Modern Landscape, Land Use, Settlement Systems, Landscape Genesis

**JEL Classifications:** J1, Q00, R1

### 1. INTRODUCTION

Nowadays, two principle factors influence the formation of landscapes of previously developed areas: Natural evolution and the type of land use; the latter, in turn, being tightly connected to the settlement pattern. Terrain, quaternary deposits, and active geological processes - both endogenous (in tectonically active areas) and exogenous (natural or anthropogenic) - are at the base of any modern landscape. The Kaliningrad region is tectonically stable, with an average of one earthquake per 100 years: The last one happened in September 2004, and, like the ones before that, had no significant impact on the area's looks, which rules out endogenous factors for landscape genesis in this particular region. The region's landscape structure is typical of the post-Würmian zone and is very much determined by its coastal location. The area can be classified as an old settlement: Active transformation of its landscape began as early as the 13<sup>th</sup> century AD. With the exception of a few strands of land within the specially protected areas, along the Baltic Sea coast and its bays, which have been spared by both recreational development and conservation efforts, there are very few "untouched" territories in the region. Save for those areas, the region's modern landscape is determined by historical and contemporary Land use practices and settlement patterns.

### 2. THEORETICAL BACKGROUND

There are several distinct approaches to studying modern landscapes, and five of those theoretical frameworks seem to form the bulk of research of the topic: Natural and anthropogenic (Isachenko 1985, 1991; Mamai 1992, 1999; Nikolaev, 2003); cultural (Kaluckov, 2007; Turovsky, 2006; Kolbovskij, 2013; Vedenin and Kuleshova, 2001; Wallech, 2005; Howard, 2011; Longstreth, 2008; Schryver, 2015); geographical theory (Rodoman, 1999, 2002; Kagansky, 2009); landscape archaeology (Nizovtzev, 2009; Karro et al., 2014); and a complex theory, propagated by the German researcher Kuster (2004). While Russian approach to landscape analysis has its roots in the physical geography (Mamai, 2005), its foreign counterpart, ever since the works of Sauer (1963), has been developing along the social geography path. Recently, however, representatives of both schools have taken a number of efforts to find a common theoretical ground. There is a growing understanding that the processes that determine geographical zoning cannot be fully explained within the social theory, and that the regional landscape changes within natural zones are largely dependent on the human land use and settlement patterns. For our case study we have selected the Kaliningrad region: A territory that cannot boast any landscape barriers,

but is abundant in the barriers of other kinds: Administrative, national, and ethnic, - all of which have undergone significant transformations over the last several years.

### 3. METHODOLOGY

Theoretical framework of this study is built up on the works of the classics of Russian geographical theory, on the one hand (Semenov-Tyan-Shansky, 1928; Saushkin, 1946; Rodoman, 1999; Solncev, 1977; Isachenko, 1991, 2001), and on the ideas of contemporary scholars, on the other hand (Kolbovskij, 2013, 2013; Keough, 2013; Wallech, 2005; Mitchell, 2000; Dietrich, 2004). It uses the terminology of the European Landscape Convention with its “holo trinity” of land cover, land use and landscape (Palmieri et al., 2011).

Modern topography of the Kaliningrad region started to take shape on the basis of the ecosystems created by the last Quaternary glaciation and under the influence of the post-glacial natural processes. It is thus of fundamental importance to start off with the study of the structure of the local landscapes, their genetic typologies, paying special attention to the parent rock and terrain (Romanova, 2011). To track changes in land use and settlement patterns (two main factors of anthropogenic transformation of environment), we have selected two moments in time: 1939, the year before the WWII with the peak registered level of land development, and the contemporary period, with data drawn from the regional statistics for 2009-2015 and the national census of 2010. To track changes in the settlement patterns, we have drawn population density maps for the territory of the present-day Kaliningrad region for both 1939 and 2009 (Romanova, 2012). This way, the source materials for this case study fall into several categories (types) of data, the analysis of which allows us to both evaluate the dynamics of landscape development and predict its future transformations.

## 4. RESEARCH RESULTS AND DISCUSSION

### 4.1. Native Types of Landscapes of the Kaliningrad Region: The Foundation of Modern Landscapes

In 2003-2011 we carried out a comprehensive surveying of the territory of the Kaliningrad region and mapped its landscapes and physiographic zones (Romanova et al., 2004; Romanova and Vinogradova, 2006, 2010, 2011). Native landscapes of the Kaliningrad region include the following types of landscapes: Landscapes of glacial origin, landscapes of fluvial origin, and landscapes of marine and lagoonal origin. These can be further subdivided into the following kinds of natural landscapes: Ground moraine valleys, ridges of end moraines, glacial lake plains, coastal landscapes, deltaic lowlands, valley landscapes, and now eroded ancient alluvial plains. Overall, an impressive diversity of natural landscapes for a region of this size, a diversity largely determined by the region's complicated development history.

### 4.2. Land Use in the Kaliningrad Region: Its History and Status Quo

Agriculture and forestry are the two types of land use that can ultimately reshape landscapes. The Kaliningrad region has a

rather low forest cover, which leads us in the direction of the other “usual suspect,” agriculture. In the regional landscape structure, along with the agricultural lands, there are lands that have not been used for a long time and are at this moment undergoing different stages of renaturalization. At the same time, some of these “stock” lands are being brought back to use either as agricultural proper or reclassified as industrial or residential territories. These fluctuations in land use are synchronized in time throughout the region and the country and are primarily connected to global or national events. In space, however, they are far from synchronic and are influenced by a bunch of “local” factors: Geographical location, environmental conditions, human capital quality, regional policy, availability of the new agricultural technology.

Over the last 70 years, Russia has experienced two land use crises: First, WWII-related, and second brought about by the transition from the planned to market economy model. During the first crisis, the battles and casualties of the Second World War left vast territories catastrophically altered and, in some cases, tragically barren. The second crisis, that of the 1990s, resulted in the abandonment of many agricultural lands and the dramatic reduction of livestock. Abandoned lands are now a staple feature of almost all traditionally agricultural regions of Russia (Tishkov, 2006).

The Kaliningrad region also experienced the adverse effects of the two land use crises, yet the process of landscape formation on this particular territory has its peculiarities that can only be explained by the local history of land development. Before the World War II what is now the Kaliningrad region was part of the Northern territories of Eastern Prussia, where more than 75% of the lands had been allocated for agriculture. The region specialized in dairy stock farming, pig farming, field farming and livestock feed farming. Before the war, 80% of the available arable lands were drained (Barran, 1994). After the war, the number and quality of workforce changed, as did the lands: There were now large areas of low quality lands, featuring broken irrigation systems and soils infiltrated with metal and explosives. Given these conditions, it is unsurprising that it took significant time and effort to restore agriculture in the region. It was only by the 1990s that the agricultural production started showing a slow but steady growth. Its specialization, however, remained traditional for the territory with its focus on dairy stock farming and livestock feed production. When the second crisis came in around the same time, the Kaliningrad agriculture went down with that of the rest of Russia.

Agriculture production in the Kaliningrad region has been steadily rising over the past few years. In 2015, for example, the total area of arable land grew to more than 243 thousand hectares (compared to 143.6 thousand hectares in 2011). Rehabilitating and bringing previously abandoned lands back into use has become one of the priority strategies of the region's agricultural policy. In 2011, the government of the region adopted the Target Program (Target Program) that is now being successfully implemented. A top indicator of the productivity of farming is the statistics on yields. The Kaliningrad region leads the other regions of Russia when it

comes to the rapeseed harvest pace, amount and bulk production, with some areas of the region breaking record in rapeseed yields (harvesting up to 5.32 tons hectare). Average crop yield of legumes and grains in 2015 was 4.76 tons per hectare in the Kaliningrad region (compared to 2.66 tons in the rest of the country). Some fields yield as much as 9.6 tons of wheat per hectare. Dairy and, more recently, meat livestock farming is developing, with numbers of cattle increasing five fold from 2009 to 2013 (according to the municipal statistics databases). That has led to the increase in areas allocated to the fodder crops, pastures and hayfields. While both the total area of arable lands and the numbers of those working in agriculture have declined since 1990, intensification of agricultural production has resulted in growing yields.

Today the territory of the Kaliningrad region is going through all stages of landscape transformation at the same time. Over the decades some previously abandoned lands have turned into “natural reserves” of sorts. Their existence spells biodiversity and they are the cornerstones of the developing environmental framework of the region. The mosaics of Kaliningrad landscapes means there is a need to better understand local conditions for spatial and strategic planning to ensure future sustainable development of the region.

#### 4.3. Settlement Patterns: 1939 versus Now

Soviet settlement in the Kaliningrad region first echoed the pre-war system, and then gradually transformed under the influence of the Soviet settlement theory and methodology, and practical experience of architects and urban developers (Lappo, 1997; Perzik, 1999; Gutnov and Glazychev, 1990). A number of territories were settled in accordance with the General Settlement Plan of the USSR, which relied very heavily on a universal approach to settlement, creation of a framework structure for settlement and the introduction of agglomeration (Vladimirov and Naimark, 2002). After the collapse of the Soviet Union, the USSR General Settlement Plan was reborn under a new name (General Settlement Plan of the Russian Federation) and reworked to account for the new reality, specifically: Influx of refugees from the former Soviet republics, return of the troops (and their families) previously stationed in the freshly post-communist countries, and the new wave of internal migrants leaving the Russian North.

Contemporary system of settlement in the Kaliningrad region and its evolution both before and after 1945 are well studied and reflected in the Territorial Complex Urban Planning Scheme of the Kaliningrad Region (Levchenkov, 2004, 2005; Fedorov, 1984, 1985, 2001, 2013; Kuznetsova, 2009). Modern geodemographic situation is characterized by the relative stability of the existing settlement system, which nonetheless is quite different from that of the pre-war period.

Before the World War II, what is now the Kaliningrad region was a densely populated part of Eastern Prussia. In 1939 the territory was populated by 1,107,197 people (compared to 968,944 in 2015). To study spatial distribution of the region’s population we have drawn population density maps for 1939 and 2009 (Figures 1 and 2). In 1939, the areas with higher population density spanned the territory of the region almost entirely, creating an uninterrupted “belt”

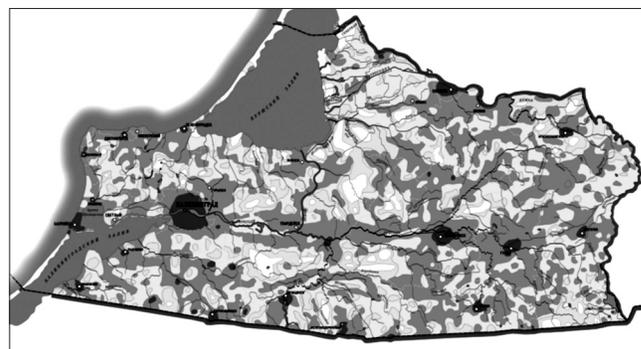
along the coast and the Pregel (now Pregolya) river. They also bundled around the cities of Königsberg (Kaliningrad), Insterburg (Chernyakhovsk), Gumbinnen (Gusev) and Tilsit (Sovetsk). In 2009 the areas with more than 100 people per square km are sparse, and less common. The Southern, Eastern and Southeastern edges of the region are barely populated at all. Most of the regional population is concentrated in the central city (Kaliningrad) and its satellite areas (Romanova 2009, 2012).

Changes in the system of settlement after the World War II as seed from the re-distribution of the population resulted in landscape changes in the abandoned areas: Former residential and agricultural landscapes have returned to their “wild” state; old roads now function as ecological corridors; new groves have helped expand forest cover of the region; and the overall diversity of regional landscapes of the Kaliningrad region has increased.

## 5. CONCLUSION

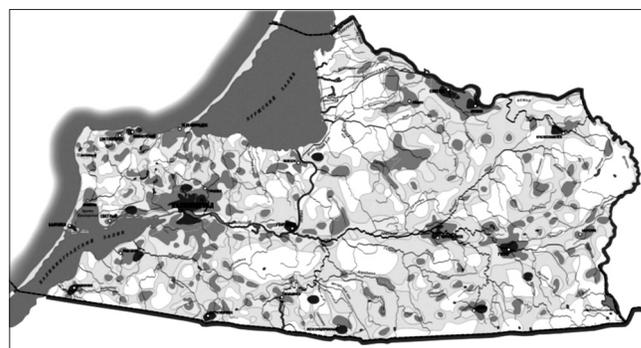
Contemporary landscapes of the Kaliningrad region are characteristic of those of the moderate climate European plains. Their region-specific features can be attributed to the century of changes in the patterns of land use and settlement. Fully developed and densely populated by 1939, this territory lived through two major crises of land use and settlement: That of the post-war

**Figure 1:** Population density of the territory of Kaliningrad region in 1939, in people per km<sup>2</sup>



Note black – over 500; dark grey 100 – 500; grey – 100-50; light grey 50-10; white – less than 10

**Figure 2:** Population density of the territory of Kaliningrad region in 2009, in people per km<sup>2</sup>



Note black – over 500; dark grey 100 – 500; grey – 100-50; light grey 50-10; white – less than 10

period and the collapse of the Soviet Union. At this moment, both the population and agriculture in the Kaliningrad region are growing. There is now higher diversity in the type of landscapes found across the region compared to the pre-war era, since the differences in natural landscapes are echoed by the differences in land use and settlement patterns. Compared to the period before the war, the forest cover increased and the formerly arable lands abandoned during the land use crisis of the 1990s have turned into ecological corridors and cornerstones of the environmental system of the region. Kaliningrad landscapes are now very close to the ecological optimum: Modern farming technologies require less manpower and space than before, and the fact that a fair share of the region's population has now reached a relative social prosperity allows the territory to follow the environmental development path; the ecological system of the region is all but constructed, as is the framework settlement structure; geodemographic conditions are more stable compared to the other regions of the Russian Northwest; and a high degree of landscape and strategic planning will ensure sustainable development of the region for decades to come.

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