

Current Problems in Developing the Natural Resource Potential of the Russian Exclave in the Baltic

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ABSTRACT

The compact Kaliningrad region boasts relatively favourable environmental conditions and a remarkable diversity of natural resources. This article seeks to compare the natural resources of the exclave and other Russian regions. The authors examine recent statistical data to estimate the region's natural and resource potential, analyse its development in different areas of the economy (agriculture, tourism, extractive industry, etc.), and describe avenues of economic growth based on a more efficient use of the region's potential.

KEYWORDS

Environmental conditions, natural resource, sustainable nature management, Kaliningrad region

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Introduction

The exclave Kaliningrad region situated on the coast of the Baltic Sea between Poland and Lithuania has a rather small territory of 15,125 km² (including the Russian parts of the Curonian and Vistula Lagoons of a combined area of 1,846 km²). It is one of the smallest regions in the Russian Federation. However, it is densely populated, being home to 976.4 thousand people, i.e. the population density reaches 64.6 people per km². The population density in neighbouring Lithuania is lower – 43.9 people per a km² – and, in Poland, it is twice as high – 123.5 people per km². However, in the border Warmian-Masurian voivodeship, the population density is only 59.8 people per km² (Rosstat; Eurostat, 2016).

The regional environmental conditions are more favourable than in many, even southern, non-Black Earth parts of Russia. A major advantage is its mild climate. Moreover, despite its small area, the Kaliningrad region is rich in natural resources. One of them is the 147 km long ice-free seacoast. However,

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the region's natural and resource potential is not fully realised. There are complex ecological problems that require prompt attention. This article will estimate the opportunities for a more effective use of the natural potential in the development of regional economy.

Active use of own natural resource potential is one of the factors contributing to the creation of more sustainable regional economy resilient to external shocks. To its 'fragility', susceptibility to external influences pointed the French Professor I. Samson (1998, 2000) in the late 1990s, who in 1997 – 1998 led the project "Taxis support to a global development plan for Kaliningrad oblast" and proposes to develop those industries that tend to use not imported raw materials, but local resources. Similar ideas on strengthening the role of local resources and the accelerated development of the agricultural sector, recreation and tourism, processing of local mineral raw resources (especially amber) were later expressed in the works of many Kaliningrad scholars (Klemeshev & Mau, 2007; Krasnov & Fedorov, 2012; Kropinova, Zaitseva & Moroz, 2015; Orlenok & Fedorov, 2005; Semenova et al., 2013; Status, 2016; Zverev, Klemeshev & Fedorov, 2005).

An analysis of statistical data shows that the Kaliningrad region performs above the national average in terms of labour productivity only in agriculture and fishery. In 2011, the gross value added per an employee in agriculture (including hunting and forestry) was 1.4 times the national average and, in fishery, 1.7 times that. Overall, the economic performance was below the national average by 22% (Gimbitsky, Kuznetsova & Fedorov, 2014). Moreover, the mentioned economic areas account for a small proportion of the regional gross product. In 2014, agriculture, hunting, and forestry accounted for 4.9% of the GRP and fishery for 1.4% (Rostat, 2016).

The other natural-resource-dependent economic areas include extraction (3.5% of the GRP), tourism, and maritime transport, and such manufacturing industries as fish processing and ship building and maintenance. Overall, natural-resource-depend areas of the economy account for 12-13% of the gross regional product. It seems that this proportion can be more significant, which means the natural resource potential of the Kaliningrad region – primarily, its coastal position and climate conditions – is not fully exploited.

Natural and climate conditions and agriculture

The Kaliningrad region has more favourable conditions for agriculture than most other Russian regions do. Nevertheless, these conditions are often inferior to those of the neighbouring European countries. Almost the whole territory of the region is a lowland plain with areas lying below current sea level. Only in the extreme South-East, hills reach a height of over 200 m (up to 242 m) above sea level. The average absolute height of land surface above sea level is only 15 m. In Russia, this parameter is lower only in Kalmykia and the Astrakhan region, which are located in the Caspian Depression. Many sections of land bordering on the lagoons lie below sea level. These are polder lands, which account for approximately 1,000 km² – over a half of all polders of the former USSR. Polder lands meant for agricultural exploitation are surrounded by dams of a length of over 700 km and crisscrossed with drainage canals.

The region has primarily sod-podzolic soils. The average humus content is 3%. Acid soils requiring liming account for a fourth of agricultural lands.

The climate is temperate, marine transitional to continental. The summer is relatively cold and the July mean temperature ranges from +17 to +18°C. Tropical air masses can lead to short heat waves with temperatures rising to 36°C. The winter is mild. The January mean temperature is -2 - -4 °C. The snow cover is thin and unstable. In some years, arctic air masses cause short periods of hard frost (up to -35°C). The average annual precipitation is 750 mm, ranging from 400 to 1100 mm, depending on the prevalence of either continental or marine air masses (Orlenok & Fedorov 2005).

The diagrams below reflect the temperature regime and precipitation in the Kaliningrad region (fig. 1 and 2).

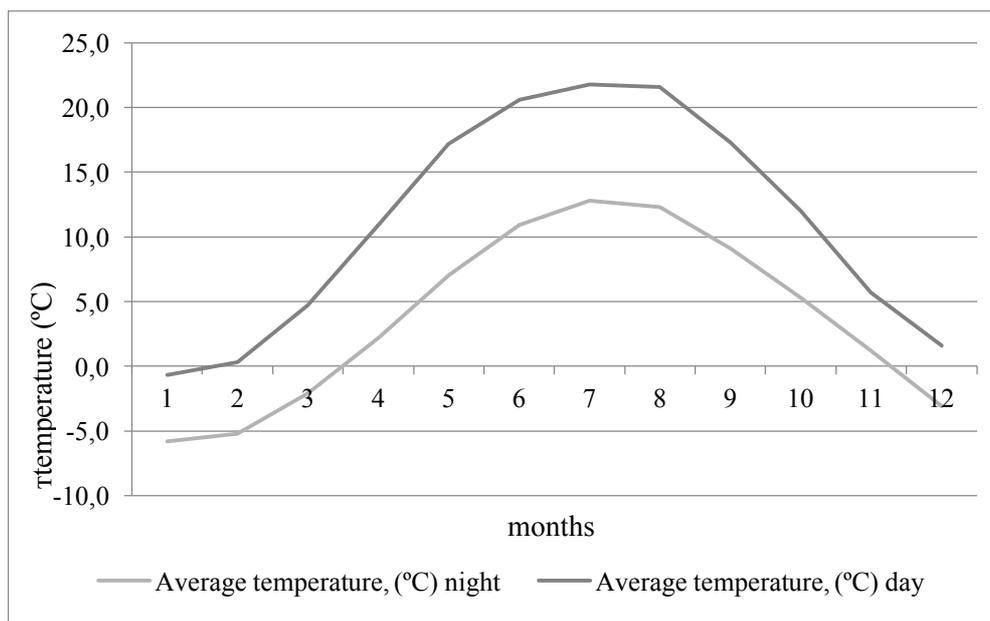


Figure 1. Average temperatures in in Kaliningrad region, °C

Source: Hydrometeorological Centre of Russia. URL: http://www.meteoinfo.ru/?option=com_content&view=article&id=1694 (last available 20.10.2016).

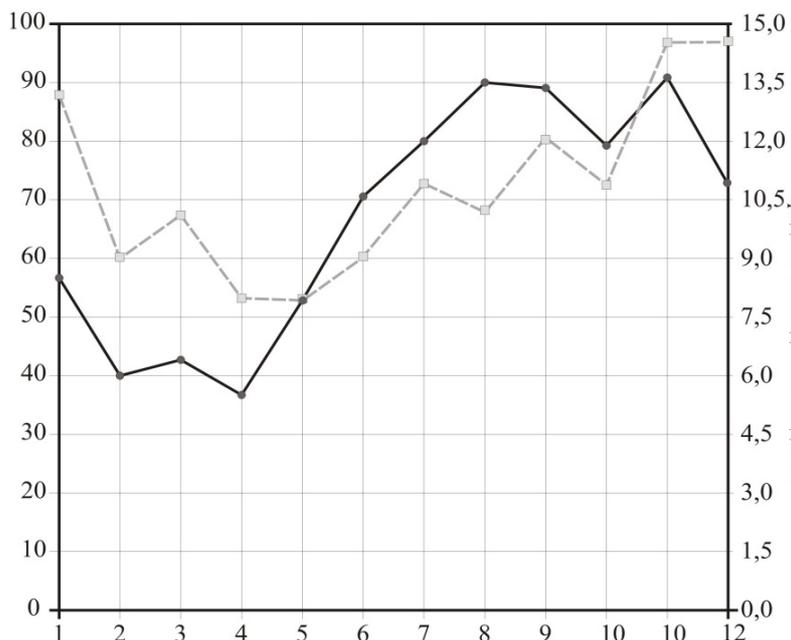


Figure 2. Average annual precipitation and the number of days with precipitation in Kaliningrad region

Note: Light dotted line - average annual precipitation, mm

Dark line - average number of days with precipitation, over 0.1 mm / days

Source: Hydrometeorological Centre of Russia. URL:

http://www.meteoinfo.ru/?option=com_content&view=article&id=1694 (last available 20.10.2016).

In comparison to the other 28 regions of Northwestern and Central Federal Districts, the Kaliningrad region has a high January mean temperature (-3°C) and an average July mean temperature ($17 - 18^{\circ}\text{C}$). The region has the third highest amount of precipitation.

A long vegetation period makes it possible to harvest forage grasses twice or even thrice during the season. The mild temperate climate is suitable for growing forage plants, grain crops, and vegetables. The productivity of natural pastures is the highest in the country. However, high humidity combined with a lowland plain relief requires considerable drainage efforts (almost the whole territory of the region is crisscrossed with drainage canals), whereas water retention in soils with a thin humus layer necessitates using a significant amount of fertilisers.

In the Soviet period, there were considerable public investments in the maintenance of the drainage canal system. One hundred eighty large farms – sovkhozes and kolkhozes – were operating in the region at the time. During privatisation, they were replaced by smaller farms, medium-sized joint stock companies and several large private companies. Today, household farms account for a large proportion of the agricultural produce.

Most economic entities engaged in agriculture do not have sufficient financial resources, and loans are charged at high interests rates. This makes it impossible to organise a modern automated agricultural production or necessary

land improvement. The current public support, which is of pivotal importance for restoring the drainage system, is not sufficient. Therefore, most agricultural lands do not serve their initial purpose anymore. In 1990, there were 416 thousand hectares of cultivated lands (about 27.5% of the total area of the region), while in 2015 this number dropped to 245 thousand hectares (16.2%), a 41% decline (Fig. 3).

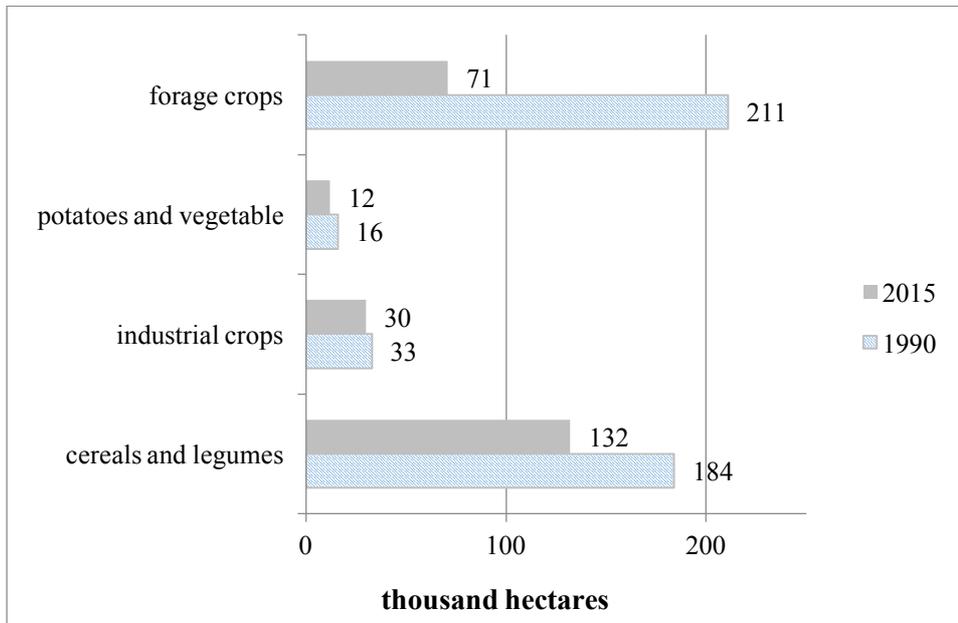


Figure 3. Cultivated land in 1990 and 2015 in the Kaliningrad region, thous. Hectares

Source: compiled by the authors based on Regions of Russia. Social and economic indicators (2010), Rosstat (2016), Kaliningradstat (2016).

A steep decline in the area of cultivated agricultural lands took place in the 1990s, when crop productivity dramatically decreased as standard fertilisation and agricultural management practices were abandoned. The area of the cropped land was decreasing until 2011, when it amounted to 143,600 ha, i.e. 35% of the 1990 level. The crop productivity started to grow in the 2000s to exceed the 1990 numbers in 2015 (fig. The 4). However, it is still lower than in neighbouring Poland and Lithuania. In 2012, the grain crop yield was 2.2 times lower than in Germany and 15% and 24% below that in Poland and Lithuania respectively. The potato yield was 2.7 times lower than in Germany, 1.5 times than in Poland, and 10% below that in Lithuania. So, in 2015 grain yield was two-fold lower than in Germany, approximately the same level as in Poland and Lithuania, and potato yields was less than 2.4 times compared to Germany, .1 times less than in Poland (Eurostat, 2016).

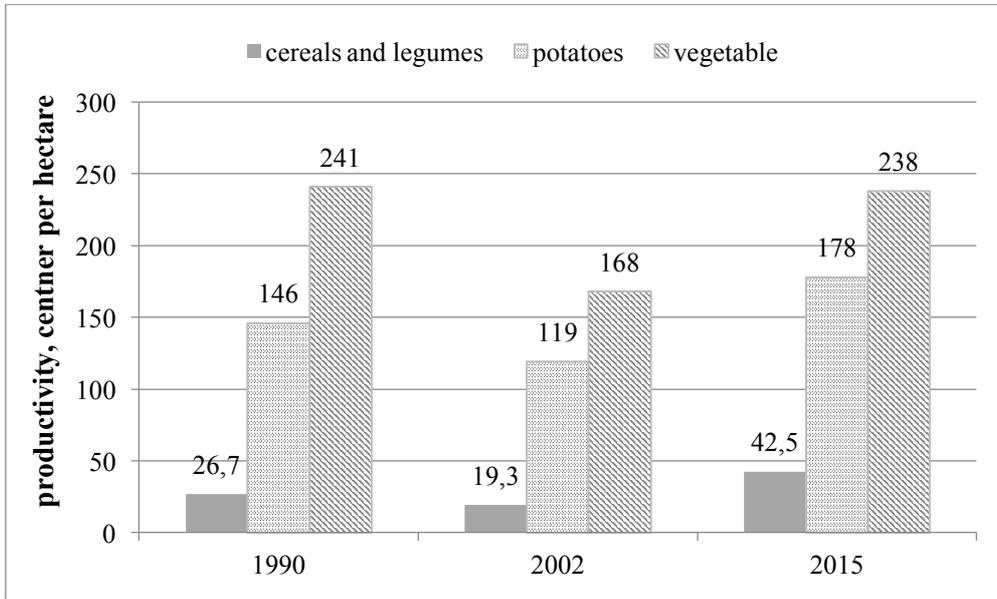


Figure 4. Dynamics of crop productivity, 1990, 2002 and 2014, centner per hectare
Source: compiled by the authors based on Regions of Russia (2016).

The Kaliningrad region is one of the national leaders in terms of the crop yield. In 2015, the Kaliningrad region had the fifth highest grain and legume crop yield throughout Russia (42.5 cwt/ha – 1.7 times the national average). Kaliningrad region inferior only to Krasnodar Krai (56.1 cwt/ha), the Republics of Kabardino-Balkaria (45.8 cwt/ha), Karachaevo-Cherkessia (44.1 cwt/ha) and Adygea (44.8 cwt/ha). However, the regional potato crop yield (178 cwt/ha) is just slightly above the national average (159 cwt/ha), ranking Kaliningrad 18th countrywide. The exclave ranks 36th in terms of the vegetable yield being 5% above the national average (238 cwt/ha). However, due to a sharp decline in the area of cultivated lands, the gross yield of major crops reached indicators of the year 1990, except the potato crop yield – still 25% below the level of 1990 (fig. 5).

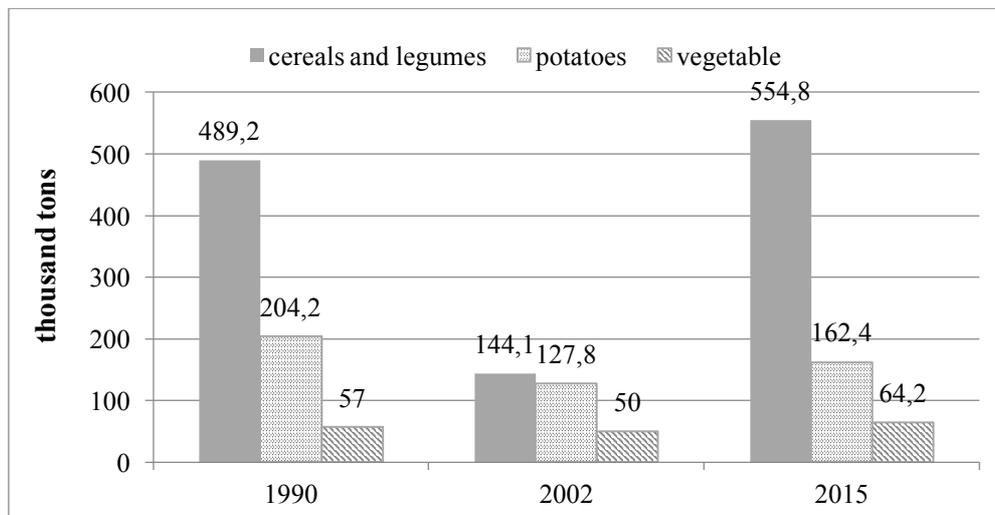


Figure 5. Dynamics of crop production, 1990, 2002 and 2015

Source: compiled by the authors based on Regions of Russia. Social and economic indicators (2010), Rosstat (2016), Kaliningradstat (2016).

Natural factors in tourism and recreation

The Kaliningrad region has equally – and in some aspect, even more – favourable conditions for tourism development than the neighbouring Polish and Lithuanian regions – Tricity (Gdansk – Gdynia – Sopot), Krynica Morska, and the Masurian Lakeland in Poland and Nida, Palanga, and Druskininkai in Lithuania. These conditions include natural factors. The other important components – cultural and historical attractions and tourism infrastructure – are beyond the scope of this study. The key advantage of the Kaliningrad region is the increasing demand for tourism services in Russia, which has a much greater number of potential tourists than Poland or Lithuania. Major disadvantages are the insufficient quantity of tourism infrastructure, a limited variety of services, and the exclave position of the region in relation to mainland Russia – this makes a journey to Kaliningrad rather expensive. The key natural factor for tourism development in the region is a seacoast with sand beaches and unique natural objects – the pine-forest-clad Curonian and the Baltic/Vistula Spits. The spits, whose sand dunes reach 60 m in height, are separated from the sea by shallow bodies of water – the Curonian and the Vistula Lagoons. The Curonian Spit stretches 98 km, 48 of which belong to the Kaliningrad region. The width of the spit ranges from 400 m to 4 km. The Baltic/Vistula spit is shorter and narrower. It is 65 km long, of which 35 belong to the Kaliningrad region. The width of the spit ranges from 300 to 1,800 m. Its seacoast is home to the resort towns of Svetlogorsk, Otradnoe, and Zelenogradsk, and other recreational centres. Their health-promoting potential is increased by locally available peloids and mineral-rich waters. Health resorts, hotels, and other accommodations located at the seaside attract many tourists from the Kaliningrad and other Russian regions. As to international tourists, most of them come to the region on experiential trips or as business tourists and, as a rule, stay at Kaliningrad hotels. Wellness tourism, which is most common for the region, is supplemented by experiential tourism, which focuses not only on the cultural and historical attractions but also the natural features and



phenomena. One of them is the pine-forest-clad Curonian Spit with its high dunes. The Curonian Spit national park occupies an area of 6,600 ha. The Spit lies on the route of autumn and spring migrations of millions of birds. In 1901, the German professor Johannes Thienemann established the very first bird banding station in Rossitten (now Rybachy). Today, bird migration is studied at the *Fringilla* (the Latin for 'finch') field station located at the 23rd kilometre of the Spit. It belongs to the Institute of Zoology of the Russian Academy of Sciences. The station attracts numerous tourists (Fedorov, 2009). Alongside the national park, the region boasts a number of other natural tourist attractions. However, visiting them is complicated by the conservation area status. As of 2016, there were 64 conservation areas occupying 64,200 ha. The Curonian Spit national park was given a federal status, whereas the other 64 objects enjoy a regional status. The latter include 51 natural monuments, one natural park (Lake Vištytis), two natural sanctuaries, and ten geological sanctuaries for amber outcrops (Ministry of Natural Resources, 2016).

However, the potential of some tourism objects is underdeveloped. These include local water bodies, which can be used in water tourism and game fishing. However, water tourism is just emerging and game fishing, especially its ice variety, is popular primarily among the locals.

By the number of tourist accommodated in the region per 1,000 residents (552 people), the Kaliningrad region is topped only by the Krasnodar region, the Republic of Altai, the Republic of Karelia, Saint Petersburg, the Novgorod region, and the Pskov region. As to the tourism accommodation increase rate, in 2005 – 2015, it was outperformed only by the Kaluga, Nenets autonomous district, and the Republics of Chechnya, Karachay-Cherkessia and Dagestan. With that, only in the Kaluga region the overall volumes are similar to those of Kaliningrad and exceed 500 thousand people. In the other four regions of the figures do not exceed 200 thousand people (Rosstat, 2016). By our estimates, the total number of tourists coming to the region may reach one million people in 2016. There are strong grounds for a further increase. The key condition is the development of tourism infrastructure offering travellers not only comfortable hotel rooms but also a wide range of services and entertainment. The most promising area is wellness tourism, which benefits from the favourable climate conditions, the Baltic coast, peloids, mineral-rich waters, and health resorts specialising in heart and lung diseases.

Mineral and organic deposits

The geology of the region has been extensively studied and numerous deposits have been discovered on its territory. The most valuable ones are those of amber and oil.

The Kaliningrad region is often called the Amber land and the Amber coast of Russia. These sobriquets refer to the fact that the Kaliningrad peninsula and the western coast of the Kaliningrad Lagoon are home to large deposits of amber. Probable reserves are estimated at 400,000 tons, which accounts for 90% of the entire world's deposits (Zagorodnykh & Kunaeva, 2005). The annual extraction rate is lightly below 0.1% of probable reserves – half of the Soviet level and almost as much as in the 1930s. An estimate of proven and probable reserves suggests that they will not be exhausted in the next 1,000 years at the current extraction rate.

A bottleneck in the amber industry is the losses of small amber fractions during extraction and processing. Unique gems that are in demand from national and international consumers (Lithuanian and Polish jewellers in the past and Chinese today) account for 20% of the extracted amber. Medium-sized fractions comprise 50% and fine fractions (<6 mm) 30%. In the Soviet period, the latter were used in the manufacturing of succinic acid (a valuable fertiliser) and amber varnish and paints. Such fractions were also used to produce pressed amber. However, in market conditions, the use of small fractions is discontinued due to falling demand and obsolete energy-intensive manufacturing processes. The expected introduction of new original and internationally employed manufacturing processes gives a reason to hope that Kaliningrad amber will be in steady demand in the next 5 – 10 years.

Oil was discovered in the Kaliningrad region in 1963. Oil production was launched in 1975. Kaliningrad boasts high-quality low-sulphur oil occurring at a depth of 1,500 – 2,000 m. Shelf oil exploration began in 1983, when two offshore oil fields were discovered. An offshore oil platform was built in the Kravtsov field, followed by the launch of offshore extraction in 2004 (Zytner, Grigoryev & Otmas, 2008).

The maximum oil production volume was observed in 2007 (1,450 thousand tons). In 2013, 943 thousand tons of oil were extracted (Kaliningradstat, 2016) and in 2014 – 853 thous.t., half of which took place at the offshore production (Lukoil-Kaliningradmorneft – URL: <http://www.lukoil-kmn.com/ppd>).

The Kaliningrad region is also rich in peat, lignite, construction materials, common salt, and potassium and magnesium salts, mineral water, and peloids.

Peat deposits account for over 7% of the region's surface, occupying more than 1,000 km². The deposit thickness is 3 – 5 m, reaching up to 12 m. Peat reserves are estimated at 310 million tons in the air-dry state. However, they are scattered over 100 small fields, which complicates the commercial extraction of peat and increases its production cost. Depending on the weather conditions, peat production volume ranges from 15 to 40 thousand tons per year (Aleksandrova & Kononova, 2016).

The Grachevka lignite field is rather small and its reserves are estimated at 30 million tons. Its lignite can be used in the manufacturing of a voluble product – ozokerite – used in metallurgy, the chemical, pulp and paper, and light industries, and medicine. However, current projects are aimed at the use of lignite as fuel. The construction of lignite mines raises concerns from both ecologists and the local community. They insist that lignite mining in the village of Grachevka, which is located in a resort area, will harm nature. Moreover, there are doubts about the cost efficiency of lignite with a low calorific value and high ash content, especially in view of its limited reserves. Construction materials – sand, clay, and gravel – are extracted throughout the region.

Numerous mineral springs have been discovered in exclave. The production of Kaliningradskaya mineral water was launched as early as 1973. Today, Maysakaya (Gusev), Tilsitskaya (Sovetsk), and Zelenogradakaya mineral water brands are bottled in the region.

Peloids found in the environs of the resort town of Svetlogorsk are used for treating a number of conditions.



There are large salt deposits in the Kaliningrad region. Common salt reserves of the Kaliningrad salt producing basin are estimated at 1,500 billion tons. However, the significant depth of burial (760 – 1225 m) complicates extraction. There are plans for salt production in the Zelenogradsk and Gusev districts (Gurevich & Kazanov, 1976).

Bands of potassium and magnesium salts, whose reserves are estimated at billions of tones, have been discovered in the salt stratum. The most promising production site is the Nivenskoe deposit located south of Kaliningrad. The plans of salt production are being discussed.

The exploration of some mineral and organic resources has just begun. Manganese nodules and titanium-zirconium sands have been found at the bottom of the Baltic Sea. Potassium salt and materials rich in sulphur and carbonates occur at a significant depth in the landmass.

Other natural resources

Water resources

The total area of the regional waters assets is 184,600 ha with the lagoons accounting for most of it.

Due to excessive humidity and flat terrain, the region has numerous rivers and lakes, many of them artificial. There are 4,600 rivers and drainage canals of a total length of 13,000 km and approximately 4,000 lakes and ponds, although most of them are relatively small. Only six rivers are more than 100 km long. The local waterways are not used in the transportation of cargoes and passengers (Litvin, 1999).

The biggest rivers are the Neman and the Pregolya. Canals connect them into a single water system. The total length of navigable waterways is above 360 km. The largest lake is Lake Vištytis located 178 m above sea level. Its area reaches 18 km² and the depth 47 m. The largest inland water bodies are the Curonian and the Kaliningrad/Vistula Lagoons, which are rich in fish. They are relatively shallow and they warm up rapidly creating favourable conditions for the reproduction and development of fish. The most valuable species include the common bream, the zander, and the Baltic herring. Such delicacy as eels is also found in the region.

The use of lagoons for wellness purposes is almost impossible due to the specific odour of the water in the summer, which is explained by the decay of algae reproducing in the lagoons. The Lagoons can contribute to the development of yachting – a promising area of cross-border cooperation between Russia and Poland in the Kaliningrad/Vistula Lagoon and Russia and Lithuania in the Curonian Lagoon and on the River Neman.

Forests

The region's forest resources are insignificant from the perspective of timber production. Forests cover an area of 281 thousand ha – 18.6% of the totally territory (or 21% if the lagoons are not take into account). With spruce-deciduous forests dominant in the area, there are also pine and alder forests in the region. 40% of the forests are planted. They perform an important nature conservation function.

The total stand of timber is 48.6 million m³. The allowable cut is estimated at 494,000 m³. However, forests are located in waterlogged areas and most of them consist of low-density hardwood species, for which there is little demand. Thus, the allowable cut is rarely fulfilled. In 2014, 221 thousand m³ of timber were harvested, i.e. 45% of the allowable cut (Aleksandrova, Kononova & Grishina, 2015). The Kaliningrad region accounts for 0.1% of the national raw timber production (Oksenoyt et al., 2015). Special attention is paid to reforestation — 1,200 hectares of woodland were restocked in 2014 (Aleksandrova, Kononova & Grishina, 2015).

Animal resources

In this category, the major resource is the fish of the Baltic Sea and its lagoons, where commercial fishing takes place. However, the geographical position of the region made it possible to organise commercial fishing in the World Ocean, where most fish and seafood are harvested. The fishing quotas of the Kaliningrad region in Baltic Sea and its bays amounted in 2015 to 48 thousand tons (more than in 2014), but were not fully exploited: Kaliningrad fishermen caught only 40 thousand tons of fish (Government of the Kaliningrad region. Fishery Agency 2016; Prime 1996-2016)

The most important commercial fish species are cods, the Baltic herring, sprats, the common bream, the zander, herring, flatfish, and salmon, whose catch is restricted (Ministry of Natural Resources, 2016). Aquaculture facilities have been established in the regional inland water bodies (including lagoons), where commercial fish are farmed in small numbers.

A territory of an area of 938 thousand ha is used for recreational hunting. The hunted animals include deer, the roe deer, the wild boar, the beaver, the common otter, martens, foxes, the racoon dog, the European polecat, the European badger, squirrels, the stoat, the European mink, the muskrat, the European hare, the grey wolf, the grey partridge, the hazel grouse, and the black grouse (Ministry of Natural Resources, 2016).

Conclusion

The natural conditions and resources of the Kaliningrad region provide a favourable context for the development of a number of manufacturing industries, agriculture, transport, and recreation. However, this potential is not fully realised. According to our estimates, the effective use of natural resource potential can increase the proportion of relevant economic activities to 30% of the regional gross product. However, this requires large investments and the development and deployment of environmentally sustainable technologies. Moreover, sustainable nature management often necessitates the development of cross-border cooperation in the case if resources are divided by national borders. A number of joint projects have been implemented by researchers and experts from Russia, Poland, and Lithuania in the framework of the Cross-border cooperation programme financed by the EU and Russia (International and interregional relations agency 2014a). New programmes are being developed within the Lithuania – Russia and Poland – Russia European Neighbourhood Instrument for 2014 — 2020 (International and interregional relations agency 2014b).

Disclosure statement



No potential conflict of interest was reported by the authors.

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