

**ICEST 2021****II International Conference on Economic and Social Trends for Sustainability of Modern Society****SECTOR PRIORITIES OF ECOLOGIZATION FOR  
SUSTAINABLE DEVELOPMENT OF THE SOUTHERN  
METAREGION**

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**Abstract**

For the Southern metaregion of Russia, with a traditionally high dependence of the economy and the life of the local community on ecosystem benefits, the search for an ecologization model turns into a decisive factor in sustainable development that determines the vector of current sectoral transformations and capitalization of comparative ecosystem advantages. A set of sectoral solutions for economy ecologization of the Southern metaregion has been developed, associated with product innovations from mining waste and non-metallic raw materials, ecosystem-adaptive orientation of agricultural industry in ensuring long-term productivity of soil and land resources, ecosystem services; moisture and water saving; forest reproduction and circulation of non-timber forest resources; ecological tourism and ecosystem services in protected areas; climatic modernization. It is shown that eco-restructuring of the leading sectors of the economy of the Southern metaregion provides not only capitalization of the variety of resource and environment-forming (life-supporting) utilities of ecosystem benefits, but also creative natural-economic competencies of ethnic households based on traditional predominantly agricultural practices and relatively new in the field of tourism, plantation cultivation of wild plants, medicinal plants, forestry, and ecosystem services.

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## 1. Introduction

For our country with a traditionally dominant role of environmental management in the economy, critical dependence on ecosystem benefits for business well-being and household livelihoods, the search for an ecologization model turns into a decisive factor in the sustainable development of Russian regions, determining the vector of current industry transformations and capitalization of obvious ecosystem benefits (Vikhoreva et al., 2020). A similar approach is implemented in the EU countries, in particular within the framework of an integrated model for sustainable development of rural localities (Panov, 2012), as well as in OECD member countries, where ecologization issues are considered through the prism of multisectoral 'green' transformations, involving, among other things, ecosystem benefits of territories in the turnover, or valorizing local ecosystem assets (Principles on Urban Policy and on Rural Policy, 2019). At the same time, as practice shows (Bondarenko et al., 2020; Denissova et al., 2019; Lyaskovskaya, 2018), ecologization of sectoral transformations is most productive within the framework of the inclusive sustainable growth concept and greening trends based on stimulation of a low-carbon, resource-efficient, eco-service economy (Inclusive Green Growth, 2012; Towards a green economy, 2011).

## 2. Problem Statement

Ecologization of sustainable development of the Southern metaregion has an objective nature, due both historically and currently to the inherent dependence of the economy and life of the local community on ecosystem benefits. Taking into account specialization of the economy of the Southern Metaregion, as well as the framework of the noted concepts of inclusive sustainable growth and 'green' economy, the sectoral locomotives of 'green' eco-restructuring, according to UNEP (Towards a green economy, 2011), should be agriculture, forestry, water industry, fisheries, tourism, and other sectors significantly dependent on ecosystem benefits.

Environmentally oriented transformations of traditional industries of the metaregion's specialization ensure realization not only of the ecosystem comparative advantages of the southern territories, but, no less important, capitalization of the creative natural-economic competencies of dominant rural, including autochthonous communities (Medyanik, 2020). In this regard, the sectoral emphasis should be placed on mobilizing the productive potential of rural economy and ethnic entrepreneurship. Obviously, a set of such sectoral solutions in the ecologization context will ensure intensification of economic activity, growth of social well-being of the population and, in general, sustainable development of regions on the southern borders of the country.

## 3. Research Questions

The study is aimed at identifying the prospects for implementation of ecosystem comparative advantages, the content of 'green' environmentally oriented transformations and climate adaptation solutions in the specialized sectors of the Southern metaregion's economy.

#### **4. Purpose of the Study**

The goal is to identify sectoral priorities of ecologization for sustainable development of the Southern metaregion.

#### **5. Research Methods**

The study is based on the method of typologies, which made it possible, on the one hand, in the coordinates of space and level gradation to single out the Southern metaregion as an intermediate formation, whose demarcation of the boundaries is determined by the integrity of ecological systems that have biome localization within the subjects of the Southern and North Caucasian Federal Districts, and, as a consequence, complementary in factors and priorities of ecologization for sustainable development; on the other hand, according to the criterion of 'natural economic profile', distinguish nature-dependent sectors, such as agriculture, mineral resources, forestry, and water industry. This approach serves as a methodological guideline for substantiating sectoral priorities for ecologization of the South Russian economy (Medyanik, 2020).

#### **6. Findings**

The variety of mineral resources in the Southern metaregion, enclosed in 3425 deposits and manifestations of minerals (Medyanik, 2020), determines the directions for development of the mineral resource sector by including traditional (Eastern Donbass, North Caucasian-Mangyshlak oil and gas province) and promising objects (fuel resources of the North Caspian shelf, the Black and the Azov seas) in the economic turnover. Here, it is important to produce product innovations from mining waste - roving, mineral wool, heat and sound insulation materials from basalt fiber; nonmetallic raw materials - silicon nanomaterials, photoelectric converters, new climatically adapted building materials (Table 1). Such industries can serve as a sectoral locomotive for sustainable development of mountainous territories, and a quick, from 2 to 5 years, payback of the project, and insignificant, about 100 million rubles, investments ensure participation of small (individual) enterprises (Alania-invest, 2021), and, finally, taking into account the requirements of 'green' development and climate adaptation, to organize production of climate-resistant covering and building materials (Table 1).

Land resources are the indisputable ecosystem competitive advantage of the Southern metaregion. It accounts for 20.6% of farmland in the Russian Federation with the best soil characteristics and, as a result, high cadastral value, and the top ten subjects of the Russian Federation include Krasnodar Krai, Stavropol Territory, Rostov Region, Republic of Adygea, North Ossetia, and Kabardino-Balkaria (Medyanik, 2020).

Taking into account long-term productivity of the key factor of agricultural production, ecologization priorities should be focused on introduction of no-till technology in agriculture, the significant environmental and economic advantages of which are evidenced by the experience of Volgograd region and Stavropol Territory (Medyanik, 2020).

At the same time, taking into account global and local ecosystem significance of fertile soils of steppe biomes used in agriculture (Smelansky & Tishkov, 2012; Wang et al., 2009; Willer & Lernoud,

2013), their economic turnover should involve production of ecosystem services, together with traditional food benefits, otherwise the ecosystem-adaptation format of agriculture (Medyanik, 2020).

Organizing natural reserves such as 'microreserves' on agricultural lands withdrawn from circulation, using fallow lands for rationed grazing, expanding the practice of nature conservation easements and encumbrances limiting the plowing of potential arable lands, access of livestock to pasture areas in order to ensure their protection regime can serve similar purposes or recreate natural habitats of wild species.

Taking into account the dominant role of agricultural sector in water consumption, which accounts for 43.3% (2018) of water consumed in the metaregion, the problems of agricultural water conservation are actualized (Medyanik, 2020). This implies introduction of water-saving technologies for drip irrigation, sprinkling with smart irrigation and water supply systems. At the same time, the potential of mountain streams as a source of high-quality water supply in public utilities and agriculture can serve to overcome acute water shortage in the metaregion.

In conditions of extremely low forest cover, among sectoral priorities for economy ecologization of the Southern metaregion is forestry, primarily associated with the expanded reproduction of tree and shrub vegetation in the form of forest protection plantations for farmland, water bodies, residential and recreational areas.

Taking into account agricultural profiling, agroforestry is extremely important in the form of reconstruction of existing and creation of new field-protective forest belts. As calculations for agroecosystems of the Lower Volga region show, forest reclamation and planting of agricultural lands along with ponds for receiving residual runoff from coastal territories can reduce consumption of irrigation water by 50-60%, create a soil moisture reserve for 12-17 dt/ha of an additional increase in grain yield (Medyanik, 2020).

Meanwhile, taking into account high labor intensity of forest reproduction in the conditions of steppe ecosystems, not only innovative technologies are required, such as moisture conservation in the root system, containerized seedlings, cloning, but also selection and seed production work to grow zoned planting material. The latter is extremely important in the Republic of Kalmykia, Krasnodar Krai, Volgograd and Rostov Regions, where there is a traditional shortage of seedlings.

Finally, taking into account, as will be shown below, non-timber, food, and medicinal forest resources, it is advisable to stimulate small businesses and households to collect and process them, as well as to develop plantation cultivation in natural conditions (organic farms). An example of this is constructive experience of cultivating reeds in the Volga delta in 1970s - 1980s, which served as raw materials for the Astrakhan pulp and cardboard mill (Forest plan of the Astrakhan region, 2018).

Equally, forest ecosystems can be in demand for hunting, beekeeping, and recreational activities. For example, in the Chechen Republic, the revival of beekeeping, which previously produced more than 100 tons of honey and other related products a year with a profitability of 44-53%, is considered as a sectoral priority in the economy development of a number of mountainous regions (Forest plan of the Chechen Republic, 2019).

Prospects for recreational development of the oldest tourist destination in the country with unique and diverse recreational factors in the context of rapid growth of recreational activity and attractiveness of

ecological types of recreation should be associated with specially protected natural areas that have not only socially and ecosystemically significant multi-utility, but also recreational value. Combination of various services within the boundaries of these territories actualizes the search for a compromise between the development of tourism and promising eco-service practices to create an ecological (green) infrastructure for reproduction of benefits that are important for nature and society by natural ecosystems (Kreindlin & Petrov, 2012).

Climate adaptation sectoral solutions in the Southern metaregion affect, first of all, sectors that are relevant to the local economy (Table 1):

**Table 1.** Sectoral priorities and measures for climate adaptation of the economy of the Southern metaregion (The Second assessment report on climate change and its consequences on the territory of the Russian Federation, 2014)

Sector	Climate adaptation measures
Agriculture	increase in the area of winter cereals, early and late-ripening varieties, as well as sub-winter crops of vegetables, green crops, intensive fruit and berry plantations, stubble and green manure crops, vineyards; heat-loving high-intensity crops, as well as subtropical agriculture; widespread introduction of water-saving and water-retaining technologies; strengthening of phytosanitary monitoring of agricultural crops and phytosanitary control, especially over the spread of quarantine climate-dependent pests.
Transport	development of engineering solutions and building materials that prevent accelerated destruction of roadbed and transport infrastructure in conditions of high variability, extreme weather and climatic parameters of the environment; ensuring road safety in adverse weather and climatic conditions.
Building	ensuring durability of building envelopes to moisture deformations by imparting hydrophobic properties to building materials, as well as proper resistance to freeze-thaw cycles; implementation of the concept 'smart home, smart building' on basis of <i>Smart Grid</i> unified energy-information system when arranging engineering infrastructure of construction projects, integrating various life support systems.
Power industry	diversification and decentralization of energy system by combining generating capacities using alternative energy sources; introduction of cogeneration technologies, autonomous power supply sources; intelligent support of climate innovations in the electric power industry on Smart Grid platform; mass use of solar collectors, photovoltaic cells in cottage construction, lighting of public facilities, pedestrian and transport infrastructure; 'heliarchitecture'.
Water industry	optimization schemes for operation of hydraulic structures in high-water and low-water years and seasons; development of alternative sources of water supply; reduction of water losses during transportation; introduction of water circulation cycles; construction and reconstruction of protective structures, anti-flood reservoirs, reservoirs in floodplains that serve as accumulators of moisture.
Forestry	engineering and arrangement of agroforestry landscapes in intensively developed agricultural territories that perform not only soil-protective, agromeliorative, hydrological, assimilation functions, but also serve as a habitat for biological species; formation of complex and mixed forest plantations in order to ensure interchangeability of species; introduction of tree and shrub vegetation resistant to regular droughts; effective proactive and reactive fire-fighting and phytosanitary measures in the forest fund; intensification of quarantine and control measures.

In the Southern metaregion, for the most part repeating the configuration of national administrative-territorial entities, relatively stable ethnocultural 'nuclei' have formed, which extend not only to the

economic and family structures and traditions of ethnic communities, but also cover a wide range of socio-economic relations.

Taking into account this specificity in the subjects of the South, a model of creative capitalization based on organic inclusion of ethnocultural features of behavior and traditions associated with the mentality of an ethnic group into economic practices may turn out to be successful. It is this model, due to the widespread use in the local economy of ethnically marked creative natural-economic competencies of ethnic households, will create preconditions for the growth of capitalization, including ecosystem resources in the republics of the South of the Russian Federation.

For example, biodiversity and endemism produce not only genetic services, but also expand opportunities for businesses and especially ethnic households to engage in the economic turnover of currently unclaimed resource benefits of the flora and fauna of the South. Thus, only in the Chechen Republic there are 672 species of medicinal plants, 561 – fodder plants, 342 – bee plants, 241 – food plants, 323 – decorative plants, 185 – dye plants, 94 – technical plants, 68 – insecticidal plants, etc. (Report on the state of the environment of the Chechen Republic, 2018).

In this regard, the emphasis should be placed on mobilizing the productive potential of the agrarian ethnoeconomy, or capitalizing creative natural-economic competencies of ethnic communities, for example, in such traditional agricultural practices as picking and processing wild berries, nuts, mushrooms, medicinal raw materials, madder breeding, beekeeping, horse breeding, sheep breeding, as well as relatively new ones, such as ethnic and rural tourism, plantation cultivation of wild plants, medicinal plants, forestry and ecosystem services.

## 7. Conclusion

Thus, sectoral priorities of the Southern metaregion's ecologization are associated with implementation of the ecosystem comparative advantages of the Southern metaregion, due to the variety of resource and environment-forming (life-supporting) functions, or the multi-useful value of ecosystem benefits, mobilization of which serves as an internal source of economic growth, social well-being, and overall sustainable development.

In the wake of the concept of inclusive sustainable growth, 'greening' trends, profile specialization and diversity, a set of sectoral solutions for the Southern metaregion's economy ecologization is associated with eco-restructuring of the agricultural sector, ensuring long-term productivity of soil and land resources, ecosystem services; moisture and water saving; forest reproduction and circulation of non-timber forest resources; ecological tourism and ecosystem services in protected areas; as well as climatic modernization. Ecologization based on mobilization of productive potential of ethnoeconomy ensures capitalization of the creative natural-economic competencies of ethnic communities based on traditional, predominantly agricultural practices and relatively new ones in tourism, plantation cultivation of wild plants, medicinal plants, forestry, and ecosystem services.

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