Reclamation of Disturbed Land in Russia: State of the Art

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Abstract. Reclamation of disturbed land is a relevant issue, as each year, more and more land becomes unsuitable for economic use due to human activity, which alters the terrain and creates anthropogenic landscape, ultimately disturbing a variety of lands. Not only is disturbed land no longer suitable for economic use, but also is subject to intensive water and wind erosion, the products of which pollute the environment. The area susceptible to the negative effects of mining is about ten times the size of disturbed area. Reclamation of disturbed land is of special relevance in Russia, as the country is a leading producer and exporter of hydrocarbons, resulting in a worrisome lead in terms of pollution with oil and petroleum products, pesticides and heavy metals, as well as in the scale of soil-disrupting activities such as construction, amelioration, logging, surveying, testing, exploration, and operation of various facilities. This paper discusses the current state of the art of disturbed land reclamation in Russia. The authors analyzed statistics from Rosreestr, Rosselkhoznadzor, and Rosprirodnadzor.

1. Introduction

Land disturbance is a key factor behind reduced fertility of soils; this process is an inevitable consequence of mining, exploration, surveying, construction, and other activities that disrupt the soil cover and local hydrology, create an anthropogenic terrain, and otherwise alter the quality of land. Thus, land disturbance is essentially anthropogenic degradation of soils.

Reclamation is an umbrella term for the activities intended to restore the fertility and economic viability of disturbed land as well as to improve the environmental conditions to serve the best interests of the society.

Land reclamation is a process regulated by the Decree of the Government of Russian No. 800 dd. July 10, 2018 On Land Reclamation and Conservation, as well as by the Land Code of the Russian Federation.

2. Materials and methods

Data for this research was sourced from the statistics of the Office of the Federal Service for State Registration, Cadaster, and Cartography of the Russian Federation (State Report on the Condition and Use of Land in Russia 2019), Ministry of the Natural Resources and Environment (State Report on the Status and Protection of the Environment in Russia 2019), Office of the Federal Service for Veterinary and Phytosanitary Supervision (Rosselkhoznadzor’s State Land Supervision in 2019), and Office of the Federal Service for Supervision of Natural Resources (Final Report of the Federal Service for...
Supervision of Natural Resources 2019). Statistical and system analysis was used to the ends of this research.

3. Results and discussion

In 2019, disturbed land totaled 1076.9 thousand hectares, a 4.5 thousand increase YoY. The following regions ranked the highest: Yamalo-Nenets Autonomous Okrug (103.7), Kemerovo Oblast — Kuzbass (91.6), Magadan Oblast (77.7), Sverdlovsk Oblast (61.4), Khanty-Mansi Autonomous Okrug (55.7), Chukotka Autonomous Okrug (47.5), Moscow Oblast (34.7), Chelyabinsk Oblast (32.3), Republic of Sakha (Yakutia, 30.9), Irkutsk Oblast (26.6), Leningrad Oblast (22.9), and Vologda Oblast (22.2, all figures in thousand hectares) [1, 2].

Most of the disturbed land was categorized as used in manufacturing, electric power industry, transport, communications, broadcasting, television, information technology, space industry, military, security, sundry special-purpose land, see Figure 1.

![Figure 1. Distribution of disturbed land by categories as of Jan 1, 2020, thousand hectares.](image)

In general, the last decade has seen an upward trend in the statistics of disturbed land used industrially or for sundry purposes (+119.9 thous. ha since 2010).

Reclamation, i.e., effort to improve the fertility and viability of land as well as to enhance the environmental conditions, is an integral process of companies whose activities disturb land. Rosprirodnadzor reports that reclaimed land totals 102.225 thousand hectares, 9.613 thous. of which is arable land, 20.913 thous. is otherwise used in agriculture, 57.416 thous. is covered with planted forests, and 13.321 thous. is for water bodies and other uses.

Identifying unused agricultural land, in particular arable land and farmland, to reclaim it and bring back into agricultural use, is a high priority for Russia’s agroindustrial complex.

As of Jan 1, 2019, 43.98 million hectares or 11.4% of the total agricultural land in Russia was unused, Ministry of Agriculture reports. Unused farmland totaled 33.08 million hectares (16.7% of the total farmland area or 75.2% of the total unused agricultural land). Unused arable land totaled 19.58 million hectares or 16.8% of the total arable land.

Beside repurposing of land that loses fertility for natural reasons, land may come out of use due to various natural factors including negative processes or rising soil acidity; or economic and social
factors including lack of finance, workforce, and technology to make effective use of land, short-term leasing of land, misuse of land that results in disturbance, etc.

Regardless of the underlying cause, the longer farmland prone to tree and shrub growth remains untilled, the less cost-effective its reclamation will be, as reclamation and restoration of soil fertility will far exceed the potential profits.

In 2019, supervisory audits undertaken by the regional offices of Rosselkhoznadzor (Russia’s agency responsible for supervision of effort to preserve and restore the fertility of agricultural land) located over 930 thousand hectares (71.9% of land law violations) of agricultural land overgrown with weeds, trees, and shrubs, cf. 68.7% in 2018; ~207.7 thousand hectares of earlier disturbed or unused land was brought back into agricultural use [1, 2].

Public agencies that supervise the country’s land resources are tasked, among other things, to enforce laws applicable to land by continuously monitoring and auditing any use and protection of land, and imposing disciplinary measures on offenders [3 - 5]. Pursuant to the Regulations on State Land Supervision as approved by the Decree of the Government No. 1 dd. Jan 2, 2015, such supervision is a duty of Rosreestr, Rosselkhoznadzor, Rosprirodnadzor, and regional offices thereof.

In 2019, state auditors addressed 73,187 violations of land law (46.55% of the total exposed violations of land law, see Figure 2).

Figure 2. State land supervision, Rosreestr, 2010-2019*.

*Data sourced from the Office of the Federal Service for State Registration, Cadaster, and Cartography of the Russian Federation.

Agricultural lands are an important natural resource of the nation, therefore subject to protection. The condition and fertility of agricultural land determine the nation’s ability to further crop production, animal husbandry, and other sectors of agriculture, an industry that produces food for the domestic market and for exportation, which drives the country’s economic growth [6-12].

In 2019, Rosselkhoznadzor’s regional offices carried out 42,008 audits (cf. 42,373 in 2018, 44,800 in 2017) of 9.8 million hectares of agricultural land, which revealed 17,17139 violations of land law affecting 1.2 million hectares. Similarly to previous years, most violations concerned tree and shrub overgrowth. Violations affecting over 326.5 thousand hectares were addressed in 2019 pursuant to Rosselkhoznadzor’s orders.
In 2019, Rosselkhoznadzor’s regional offices continued to locate mineral-producing quarries on agricultural land, unauthorized landfills, debris and waste accumulation sites [14-17]. The number and area of quarries on agricultural land in Russia had been showing a downward trend, see Table 1.

Table 1. Quarries and landfills found on agricultural land, 2015-2019.

| Year | Quarries found pcs. | Of those, reclaimed thousand hectares | Landfills found pcs. | Of those, eliminated thousand hectares |
|------|---------------------|--------------------------------------|----------------------|----------------------------------------|
| 2015 | 447                 | 1.27                                 | 91                   | 130                                    |
| 2016 | 410                 | 1.12                                 | 52                   | 33.8                                   |
| 2017 | 525                 | 2                                    | 42                   | 39.7                                   |
| 2018 | 327                 | 0.96                                 | no data              | 101                                    |
| 2019 | no data             | 1.5                                  | no data              | 80                                     |

*data sourced from the Office of the Federal Service for State Registration, Cadaster, and Cartography of the Russian Federation; and Rosselkhoznadzor*

In general, state supervision of land is intended to guide land owners, users, landlords, and tenants on rational, purpose-appropriate land use in compliance with the applicable law, terms and conditions. Civil liability and corrective actions help right the wronged rights of legitimate land owners and timely bring the land back into economic use.

The analysis of agencies’ reports collected by the regional offices of Rosreestr showed that budgets of various levels and extrabudgetary funding was spent in 2019 to carry out special surveys (soil surveying, disturbed land reclamation, other surveys and explorations) in several Russian regions.

In St. Petersburg, the Committee for Natural Resources, Environmental Protection and Safety was contracted to evaluate the presence of heavy metals and organic toxicants in soils [13].

Reclamation projects were under way in Omsk Oblast. Agroecological, agrochemical, ecological and toxicological studies of agricultural land have been carried out in the Republics of Bashkortostan, Karelia, Mari-El; Voronezh, Saratov, and Tver Oblasts; and the Chuvash Republic.

4. Conclusion
To sum it up, we’d like to say that regional comprehensive land monitoring systems must be put in place if disturbed land and negative effects of degradation are to be detected in a timely manner. When devising a roadmap to address the negative effects of natural and anthropogenic factors on land, one must focus on the metrics that show more efficient use of land in the region as well as on the local natural, geological, and socioeconomic specifics.

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