Ecology, health, and human dynamics as dominants of innovative development

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Abstract. The article is devoted to the problems of human resource management in the modern environment in the context of sustainable development of the region. The authors of the study suggest the need for a socio-economic policy in the North Ossetia-Alania and the Russian Federation, which will help to reduce the adverse effects of various environmental factors on human resources, demographics and health of the region. In conducting the study, the authors found that anthropogenic impacts lead to environmental problems of various kinds. The consequence of this is an increase in morbidity and natural loss of population characteristic of several regions of the country. The authors had taken account of the provisions that a decent quality of life, a healthy population, and thus a high level of human development can be ensured only if the natural environment is preserved and maintained at an appropriate quality. The main provisions of the article and the results presented are interesting for further theoretical substantiation, research and practical recommendations in the field of human resource management strategy development, their development and use. Allow to develop strategic decisions on the problems of formation and consistent implementation of a unified state and regional policy in the field of preservation of human resources, to implement the most ambitious programs aimed at improving public health and the environmental situation.
Keywords: human resources, public health, ecology, contradictions of development, strategy development

1 Introduction

Analysis of economic and other human activities allows us to adequately assess the negative impact of industrial and agricultural production, technological development on demographic and other social processes, on the formation of human resources.

In this regard, the study of the impact of the state of ecology, natural environment orohydrographic conditions and other components of natural-territorial complexes (NTC) on human resources is becoming increasingly relevant in the modern socio-economic context. We have already written about the need to prioritize the science and technology

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vector, such as compatibility of technology with humans, compliance with environmental regulations, environmental reconciliation, compliance with the goals of socio-economic sustainable development [1].

Economic use of the territory, the level of development of production largely predetermines the environmental characteristics of the mountain and foothill region. The issues of the state of ecology of mountain and foothill territories are devoted to the research of famous scientists, these are Skochinsky A.A., Rzhevsky V.V., Ushakov K.Z., Alborov I.D., Kamenetsky E.S. and others.

Many authors, such as A.P. Maltseva, Ya.V. Subbotina, S.A. Belykh consider environmental and economic security as a prerequisite for a comfortable and healthy environment [2].

2 Materials and methods

In the V.I. Danilov-Danilyan's article "The Global Ecological Problem and Sustainable Development" the author says that no technogenic environment can replace the biosphere. The scientist writes that the metamorphosis of public consciousness should be linked, among other things, to the need to refuse thoughtless use of scientific and technological results without anticipating environmental and other consequences [3].

V.M. Evstropov, E.A. Trushkova and Y.V. Bobrova study the impact of environmental factors on health, considering environmentally caused diseases [4]. Ilona Kickbusch, David Gleicher developed the Global Health Program [5]. Duff J.H. et al. propose a Global Public Health Convention for the 21st Century [6]. The Global Convention makes recommendations for strengthening global public health governance and promoting compliance with global health security rules. Kickbusch I., Gleicher D. suggest strategic leadership for health in the twenty-first century [5]. E.I. Lazareva, T.Yu. Anopchenko with groups of scientists offer to increase socio-ecological potential in the system of sustainable management of innovation economy, diversify regulatory powers in social, environmental and economic relations as a factor to stimulate regional development [7, 8].

V.N. Mangasaryan, substantiating the dialogic nature of the interaction between nature and society in the process of coevolution, says that man "cannot develop outside certain socio-natural relations [9]. B. Evstropov, E., Trushkova, Y. Egorova give a general characteristic of modern ecological structure, recognizing that ecological problems are urgent for many regions of Russia and the world as a whole [10].

The authors of the monograph "Ecology. Management. Man", V.G. Larionov et al. analyze and evaluate the level of environmental pollution, talk about the creation of clean cities and their impact on the health of the nation, the eco-oriented development of modern urban planning in order to ensure human health [11].

All cases of realization of human resources in the sphere of production, other spheres of activity get the defining value in innovative economic and social development. E.I. Lazareva, D.S. Lozovitskaya give, estimation of parameters of scientific and technical development in the model of economic growth [12].

In turn, a scientifically sound solution to the problems of formation and development of human resources will contribute to the goal of forming a healthy socio-economic system [13]. Improvement of the environmental situation should be the result of targeted economic and technological changes.

3 Results

As a result of observations and environmental monitoring, the North Ossetian Republican Center for Hydrometeorology records exceedances of maximum permissible emissions into the atmosphere [14]. Emissions from stationary sources by waste and pollutant groups, such as:

solid waste – since 2014. (0.337 kt) gradually decreased until 2019. (0.226) then rose to 0.469 in 2020;

gaseous and liquid emissions amounted to 3,147 thousand tons in 2014. 3.147 thousand tons, with a slight decrease in the indicator in the study period increased in 2020 to 3.810 thousand tons;

steady reduction of sulfur dioxide emissions is observed from 0.332 in 2014 to 0.140 thousand tons in 2020, hydrocarbons (without volatile organic compounds) from 0.854 in 2014 to 0.105 in 2020;

emissions of nitrogen oxide (0.269-0.791 thousand tons) and VOCs (volatile organic compounds) grew steadily from 0.098 to 0.355;

carbon oxide, other gaseous and liquid emissions remained virtually unchanged during the study period and amounted to 1.489 and 0.110 thousand tons, respectively. According to the reviews by Roshydromet, the state of atmospheric air in the capital of the Republic is characterized by high and very high levels of pollution. In 2019, stationary sources emitted 7,216 thousand tons. According to Rosprirodnadzor, stationary sources emitted 1,075 tons of pollutants into the atmosphere of RNO-Alania in 2020 [14].

It should be noted that the ecology of North Ossetia is determined not only by air pollution. Pollution and destruction of land, water bodies and rivers is caused by mining and processing of minerals, activities of enterprises producing alcohol, vehicle fleets and metallurgical companies. The problems of the use and processing of mining waste, harmful emissions into the atmosphere, and discharges of various types of waste into rivers are topical.

The state of the environment is becoming increasingly important in human physical development, health, reproductive function. The above enumerated environmental factors adversely affect the health and number of the population (Table 1). The table was compiled by the authors according to the materials of Rosprirodnadzor [15].

Table 1. Population (people).

Years	Born	Died	Growth, decline,	Died before the age of Under one year	Population (thousand people)
2014	10798	7554	3244	116	704.0
2015	10261	7511	2750	92	705.3
2016	9901	7344	2557	68	703.7
2017	8985	7211	1774	50	703.23
2018	9180	7180	2000	42	702.0
2019	8575	7211	1364	53	698.0
2020	8220	8566	-346	33	695.0

The data in the table indicate that, in general, a negative trend in the population from 2014 to 2020 is evident. The number of births decreased from 10798 to 8220, respectively. In 2020, there were 346 more deaths than births. The population decreased during the study period from 704,000 in 2014, 705 in 2015 to 695.000 in 2020. In 12 months 2019 the mortality rate of the population of the republic was 10.3 per 1000 population (12 months of 2018 – 10.2, the Russian Federation – 12.3, the North Caucasus Federal District – 7.3). Natural increase in population – 2.0 (12 months 2018 – 2.8, Russian Federation – natural

decrease 2.2, North Caucasian Federal District – natural increase 6.2). Compiled by the authors.

4 Discussion

In the period under study (2016-2020), the Ministry of Health carried out work on the state program "Development of Healthcare of RNO-Alania" developed for 2014-2020. As a result of this work, there was a decrease in mortality (10.7 in 2015, 10.3 in 2016), infant mortality (from 8.9 in 2015, 7.1 in 2016), from circulatory diseases (from 683.4 in 2015, 655.6 in 2016), malignant tumors (from 169.7 in 2015 to 163.0 in 2016), tuberculosis (from 7.4 in 2015 to 6.2 in 2016). As a result of this work, there was a decrease in infant mortality (from 7.1 in 2016 to 5.4 in 2017), from circulatory system diseases (655.6 – 2016, 591.7 – 2017), from malignant neoplasms (163.0 – 2016, 137.3 – 2017), from traffic accidents (from 13.9 to 9.1). The all-cause mortality rate decreased from 10.3 in 2016 to 10.2. Population mortality from cardiovascular diseases in 5 months. According to the operative data the mortality rate was 608.5 per 100 thousand people (for the same period of 2020 – 595.2, the target for 2021 is 505.0). The growth of mortality from cardiovascular diseases was mainly due to mortality from myocardial infarction: according to operative data for 5 months it was 48.9 (in 2020 – 44.6 per 100 thousand people), mortality from cerebral circulation disorders: for 5 months of 2021 it was 69,4% (in 2020 – 44.6), and 42.5% higher than in 2020. According to operative data it was 69.4% in 5 months of 2021, which is 42.5% higher than in 2020 – 48.7. Lethality for 6 months. 6 months of 2021 from myocardial infarction according to operative data was 10.9, which is higher than in the same period of 2020 – 9.8; in 6 months. The mortality rate from cerebral circulation disorders in 2021 was 15.3% (15.5% in 2020). The increase in population mortality from cardiovascular diseases can be explained by increased social tension due to the pandemic coronavirus infection.

The current epidemic situation complicates the possible work on the early detection of cancer. Due to the epidemic situation the visits of specialized oncology teams were postponed to the 1st quarter of 2022. In order to expand the treatment and diagnostic capabilities of the State Budgetary Institution for Obstetrics and Gynecology, the federal budget funds in the amount of 81,012,300 rubles were allocated. Contracts have been concluded for the supply of 21 units of medical equipment for oncology service. For six months of 2021, the mortality rate from malignant neoplasms according to operative data was 138,8 per 100 thousand people, while the target for 2021 is 148,5. In 2021, 52.0% of children are covered by medical examinations and preventive check-ups. The infant mortality rate for the first five months of the year 2021. According to operational data, the infant mortality rate decreased by 29.7%, amounting to 2.6 per 1,000 live births (3.7 in the same period of 2020) [15].

A convincing illustration of the impact of the environmental situation on public health is the data concerning such disease as atrophic rhinitis. The authors processed the primary data and compiled a table based on the materials of the Republican Oncologic Dispensary in the period from 2014-2018. Data collected by V.P. Kudzaeva assistant of Department of Otorhinolaryngology with Ophthalmology, North-Ossetian State Medical Academy. There were 140 patients under observation and treatment with the diagnosis of chronic atrophic rhinitis from 6 to 9 years and more according to the duration of the disease (Table 2).

Table 2. Patients with atrophic rhinitis (people, %).

Years	Number of years

	30-40	40-50	50-60	60-70	70 years or more
2014	3 – 2.1	11 – 7.8	8 – 5.7	5 – 3.6	2 – 1.4
2015	2 – 1.4	9 – 6.9	9 – 6.9	5 – 3.6	3 – 2.1
2016	4 – 2.8	11 – 7.8	7 – 5.0	4 – 2.8	4 – 2.8
2017	2 – 1.4	8 – 5.7	5 – 3.6	3 – 2.1	3 – 2.1
2018	5 – 3.6	11 – 7.8	8 – 5.7	4 – 2.8	4 – 2.8

In the study period, according to experts, the main factors that led to the disease in persons of mature and elderly age can be ranked as follows: professional activity – 25%, adverse environmental factors – 13%, other causes – 62% (Compiled by the authors). Implementation of the state program "Health Care Development of RNO-Alania for 2019-2024" continues to be carried out in 5 directions (subprograms), within the framework of 9 regional projects and 5 departmental target programs.

5 Conclusion

In conclusion of the research, we can make a number of conclusions. First of all, the goals and priorities of the modern policy in the field of formation and use of human resources of the regions should correlate with the national goals of sustainable and innovative development.

Management structures at various levels should initiate the development of strategic interdisciplinary, aggregated programs of scientific and practical nature aimed at solving the contradictions associated with the development and use of new technologies, their environmental and social implications.

It is necessary to use world experience in identifying priorities and shaping the needs of society, to update the experience of domestic forecasting and theoretical developments to select the appropriate tools and mechanisms for the development and implementation of strategic programs.

Modern features of social management require a radical revision of the directions of technological and economic vectors of the modern world in terms of ecology, public health and the dynamics and quality of human resources as the dominant factors of innovative development.

References

1. N.I. Khosroeva et al., Europ. Proc. Soc. Behav. Sci., **76**, 1621-1627 (2019). https://doi.org/10.15405/epsbs.2019.12.04.220
2. A.P. Maltseva, Ya.V. Subbotina, S.A. Belykh, Bul. Kama Soc. Inst., **1(88)**, 70-75 (2021)
3. V.I. Danilov-Danilyan, Bul. Moscow Univ. Ser. 6: Econ., **4**, 8-23 (2019). https://doi.org/10.38050/01300105201942
4. V.M. Evstropov, E.A. Trushkova, Yu.V. Bobrova, Notes Scientist, **12**, 46-50 (2020)
5. I. Kickbusch, D. Gleicher, Strategic Guidelines for Health in the 21st Century (World Health Organization Regional Office for Europe, Copenhagen, 2012)
6. J.H. Duff et al., Health Pol., **6(6)**, E428-E433 (2021). https://doi.org/10.1016/S2468-2667(21)00070-0

7. E. Lazareva, E. Roshchina, O. Gorbaneva, A. Murzin, *Socio-ecological potential increment in the system of innovation economy sustainable management*, in Proceedings, 2nd International Conference on Control Systems, Mathematical Modeling, Automation and Energy Efficiency, 195-200 (2020). https: https://doi.org/10.1109/SUMMA50634.2020.9280628
8. T.Yu. Anopchenko et al. Diversification of Regulatory Powers in Social, Environmental, and Economic Relations as a Factor for Stimulating Regional Development, in A.V. Bogoviz (ed.), The Challenge of Sustainability in Agricultural Systems. Lecture Notes in Networks and Systems, **206**, 561-570 (2021). https://doi.org/10.1007/978-3-030-72110-7_62
9. V.N. Mangasaryan, Theory Pract. Quest., **3(1)**, 113-116 (2011)
10. V. Evstropov, E. Trushkova, Y. Egorova, Sci. Almanac Black Sea Reg., **2(18)**, 48-57 (2019). https://doi.org/10.23947/2414-1143-2019-18-2-48-57
11. B.G. Larionov et al., Ekologiya. Upravlenie. Chelovek [Ecology. Management. Man] (Publishing and Trading Corporation "Dashkov and K", Moscow, 2021)
12. E.I. Lazareva, D.S. Lozovitskaya, Bul. Peoples' Friendship Univ. Rus., Ser.: Econ., **28(2)**, 123-136 (2020). https://doi.org/10.22363/2313-2329-2020-28-1-123-136
13. N. Khosroeva, J. Blieva, Smart Innov., Syst. Techn., **139**, 529-535 (2019). https://doi.org/10.1007/978-3-030-18553-4_641-1628
14. Severo-Osetinskii tsentr po gidrometeorologii i monitoringu okruzhayushchei sredy – Filial [North Ossetian Center for Hydrometeorology and Environmental Monitoring – Branch]. Accessed on: March 05, 2022. [Online]. Available: http://www.meteorf.ru/about/structure/cgms/3150/
15. Federalnaya sluzhba po nadzoru v sfere prirodopolzovaniya [Federal Service for Supervision of the Use of Natural Resources]. Accessed on: March 05, 2022. [Online]. Available: https://rpn.gov.ru/activity/reportsreceiving/air/