

# The concept of sustainable development as adopted by environmental and geographical school education: Russia and Kazakhstan

## El concepto de desarrollo sostenible adoptado por la educación escolar ambiental y geográfica: Rusia y Kazajstán

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#### ABSTRACT:

The article addresses the possible ways to materialize the ideas of sustainable development documented at 1992 Rio UN World Summit and developed in subsequent documents in the aspect of environmental and geographical education at schools of Russia and Kazakhstan. The article introduces the models of contemporary environmental education as viewed in the perspective of new Federal State Educational Standards and the main education strategies adopted in both countries as a means of forming pupils' knowledge and skills in terms of sustainable development.

**Keywords:** sustainable development, ecological culture, environmental education model, geographical education

#### RESUMEN:

El artículo aborda las posibles formas de materializar las ideas de desarrollo sostenible documentadas en la Cumbre Mundial de las Naciones Unidas de Río de 1992 y desarrolladas en documentos posteriores en el aspecto de la educación ambiental y geográfica en las escuelas de Rusia y Kazajstán. El artículo presenta los modelos de la educación ambiental contemporánea como se ve en la perspectiva de los nuevos Estándares Educativos Federales Estatales y las principales estrategias educativas adoptadas en ambos países como un medio para formar los conocimientos y habilidades de los alumnos en términos de desarrollo sostenible.

**Palabras clave:** desarrollo sostenible, cultura ecológica, modelo de educación ambiental, educación geográfica

## 1. Introduction

Basic documents, adopted by the world community at the UN World Summit on Environment

and Development in Rio de Janeiro in 1992 regulate – as they come to realization – the dynamics of education system aspiring to develop in a sustainable way. Education was acknowledged to be “a decisive factor of changes” shifts toward a sustainable future of the civilization, which, as is presumed, will “satisfy our current needs never neglecting the matter of how generations-to-come will satisfy theirs” (Klantsov, 2012; CEE RK, 1998).

Among other directions in sustainable development, the following three components were distinguished in the Concept: *economic*, suggestive of completing certain long-term economic projects conceived in awareness of nature laws as determinant in terms of ecological consequences; *ecological*, suggestive of stable functioning of physical and ecological systems on the Earth; *social*, aimed at preserving cultural and social stability and reducing the effect of possible conflicts. Thus, the mainstream task of the human development in the future can be defined in terms of ecological feasibility, that is, balanced consideration of nature’s capacity to satisfy humans after in years whenever it comes to current economic and social interests.

## 1.1. Literature review

The analysis of current research on implementation of sustainable development concept in education demonstrates other authors assess the perspectives, approach the problem, and suggest the ways and directions to solve it. The experience of Chinese scholars shows that realization of ecological education within sustainable development idiom is bound by a number of factors to include social and economic as well as demographic ones. The integrated model of sustainable ecological development they introduce adopts the static analysis method of “ecological footprint” which proves applicable in planning ecologically sustainable development of territories. Yet the very static character of the method restrains its efficiency when it comes to conceptual foresight in sustainable development as a process (Li et al., 2017). In order to provide theoretical grounds for sustainable ecological development, another group of scholars conducts an empirical research to understand how nomadic culture and efficient use of grassland by modern nomads influence natural habitat. The researchers conclude that Mongolian nomadic culture, unlike the globally spread agrarian one, prevents territories from desertification. Therefore, the planet’s environmental safety depends on man’s environmental friendliness, human ecological culture (Zhang et al., 2007). Ecological efficiency could become instrumental in the global economy’s transition to sustainable development. It gives countries a competitive edge in their pursuit of civilized ways (Caiado et al., 2017). In general, the authors of this article share the scholars’ concern about sustainable development as part of the global agenda (Rodrigues, 2016).

The Concept of Sustainable Development alongside with other documents (Agenda 21, the Rio Declaration on Environment and Development, the UN Framework Convention on Climate Change, the Kyoto Protocol, the UN Convention on Biological Diversity) denoted the world community’s understanding of the fundamental importance to consider the ecological imperatives in terms of the Earth population survival (Zahlebny, 2011). In this context, forming people’s ecological culture as an “immanent vector for the entire twenty-first century civilization’s culture in full diversity of its elements and layers” goes to the foreground, alongside with ecological thinking and projecting (Zahlebny, 2011).

In V. Yasvin’s opinion (1999; 2000), ecological culture as a notion suggests people’s ability to apply their ecological knowledge and skills in practice. A document called “Principles of state policy in the field of environmental development of the Russian Federation for the period till 2030” also stresses the importance of forming ecological culture in reliance on ecological education and upbringing (RF MNRE, 2012). The mechanism for the implementation of the assigned tasks may be comprised of:

1. Forming population’s ecologically responsible outlook;
2. Introducing the environmental protection issues into new education standards;
3. Providing orientation of instructions on ecologically responsible behavior in the process of upbringing and teaching in education establishments by including a number of requirements that regulate school students’ ecological literacy into state education programs;

4. Introducing the issues of forming ecological culture, ecological education and upbringing into federal and regional programs

The existing experience of many countries in organizing ecological education infers close cooperation with higher education institutions aimed at developing a unified (global) curriculum to study the problematic aspects of sustainable development. The experience of Germany and the USA testifies to the efficiency of an integrated approach supplemented by digital technology for successful systematic training of students in the area of ecological education (Caniglia et al., 2018). Though there is an opinion that the higher school curriculum plans for the subject disciplines supposed to form practical skills and knowledge are not demonstrative enough when it comes to rendering the essence of ecological events, so they do not promote ecological education of students (Temirbekov and Yesnazarova, 2013). Opportunities afforded by the education for sustainable development should be commonly comprehended and recognized. College and university education provides more than just practice oriented knowledge, it teaches ethics – something that one should never delete from the educational agenda. Students should be aware of the axiological aspect of sustainable development processes (Ploum et al., 2018).

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## 2. Methodology

Forming a person's ecological culture suggests changing the approaches in an education system where mere translating of ecological knowledge content should be replaced by developing a topical activity-oriented education model, which, in its realization, is expected to call for individual's actions, promote his/her ability to make decisions, articulate judgments, model, project, support viewpoints when research is underway, and draw conclusions. It is the activity-oriented approach that the UN-adopted European Education Strategy is based upon, which essentially is aimed at forming young folks' readiness to "live in a world where prediction can fail", to find bearings in rapidly changing ecological and social conditions (Zahlebny and Dzyatkovskaya, 2010; RF NS ESD, 2005.).

The analysis of "ecological education" as a concept and models for its making and implementing fails to attest as to its complete newness. The term was first introduced by the International Union for Conservation of Nature (IUCN) in 1970 and was agreed to signify the process and the result in systematic learning, skill development and aptitude formation in the area of operation in natural environment, its conditions and consequences of environmental change (Snakin, 2000). The theorists of the later period specified the aim of ecological education as forming ecological culture of individuals and society, a culture that would determine human attitude to the environment (Zverev, 2003; Zahlebny et al., 2012; Zahlebny, Dzyatkovskaya and Grachev, 2012).

In the period from the 1970s through the 1990s ecological education – at its most – appeared to be education in the subject area of ecology as a scientific discipline with biological and geographical content. The discipline subject matter covered relations between biosystems and their habitats. This period of ecological education development is commonly referred to as science-centered, as it was the scientific basis of ecology that was then defined.

In the 1990s and 2000s when the education paradigm tended to alter towards humanization and humanitarization as the mainstream education approach, center of gravity in environmental education shifted towards personality related matters, such as personal motivation, basic aims and ways of human conduct. The ecology problems of particular territories or the planet were to be associated with the formation of a new, natively human attitude to environment as a value of human life. Issues such as promoting Love to Nature, sensible treatment of Nature became primarily important in ecological education. This period in the development of ecological education is now regarded as personality-centered, in A. Zahlebny's opinion (2011).

A contemporary poly-cultural dimension stimulates the appearance of new environment-related concepts and attitudes. The globality of the problem of ecological education has recently been concerned with axiological side of life-in-all-forms-and-appearances preservation conceptual framework. Thus viewed, the ecological education can be treated as

an important ethic category, universal in its applicability and inalienable from the individual's general culture. And ecologically correct behavior is formed with reference to the applied character of natural science as well as interrelation between education and the nature (Otto and Pensini, 2017). This period of ecological education development is regarded as culture-centered.

As can be seen from the above, the ecological education at its present stage is considered in terms of basic human values and to the benefit of sustainable development of the planet.

And yet the issue of mapping ecological knowledge within the borders of school education has not been depleted in academic discussion. The existing conceptions of ecological education in the comprehensive school can be reduced to two major models, the monodisciplinary model and the polydisciplinary model (Ponomareva, 2005). The monodisciplinary model contemplates studying ecology as a separate subject, continuous ecological education of children being its realization mode. The polydisciplinary model presupposes inclusion of ecologically marked materials into the natural scientific and, though not as often, into the social and humanitarian disciplinary cycles. This, in turn, points to an interdisciplinary character of the education. Interdisciplinarity is caused by the character of those subject areas that are involved in the implementation of environmental education more often than others (geography and other geosciences) (Annan-Diab and Molinary, 2017; Kallas and Solovjeva, 2015). However, the unification of curriculum plans and testing used to check the learners' knowledge prominently restrict and complicate the processes of perspective education within the framework of ecology and sustainable development problems (Pauw and Beneker, 2013). Some scholars believe that the 21st century will witness the formation of a separate science dedicated to the problems of sustainability and aimed at teaching how to comprehend, explain and solve major problems the human race faces, to consider sustainability from various viewpoints to include the assessment of negative consequences (climate change, environmental pollution, poverty, disasters, disease, etc.). Interdisciplinarity is supposed to be the mode of coexistence of sciences (natural sciences, social sciences, applied knowledge) (Becker, 2014).

The current state of education development in Russia when new Federal State Educational Standards (FSES) are implemented, makes it possible to construct and accomplish yet another model of ecological education – the metadisciplinary model, wherein certain metasubject notions (a human being, environment, society, nature and so forth) will be adopted as content-essential, with metasubject results of school student's activity to prove the model viability. This way of modeling where active learning becomes the point, is expected to promote the implementation of major ideas of sustainable outlook development.

The subject area of biology claims incontestable leadership in terms of ecological content within the polydisciplinary model of ecological education, but there is a number of nature and society focused disciplines that contribute to forming schoolchildren's ecological culture and ecological thinking.

Teacher becomes an important agent of ecological education providing his/her readiness to carry out this activity. However, school-to-school case studies show that there are teachers who are not ready to participate in this kind of work and there are schools where sustainable development matters are off curricular as they are considered by the teachers to be exclusive province of economics and economy knowledge. Therefore, the relevance of improving ecology and sustainable development related knowledge attitude and practices of teachers, as well as provision of everyday life situations to illustrate the ecology and sustainable development theory essentials remain indisputable (Osetkiewicz et al., 2017).

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### **3. Results**

To assess the possibilities of school geography course content in terms of sustainable development concept implementation, the authors have analyzed the FSES on geographical education, programs and compulsory school geography schoolbooks content (grades 5-9) in Russia and Kazakhstan, respectively. One out of seven progressive series of schoolbooks (the so-called classical series) available in Russia and the standard program on geography (grades 6-9) employed in Kazakhstan) were used as a study basis (Table 1)

**Table 1**

Geography program content-related component aimed at forming schoolchildren's knowledge and skills in the perspective of sustainable development, Russia

<b>Grade, course</b>	<b>Program part</b>	<b>Educational topics aimed at building knowledge and forming skills in the area of sustainable development</b>
Grade 5 Geography: An introductory course	I. What geography studies	1. The world we live in 2. Earth science (ecology) 3. Geography – a science about the Earth
	II. The Earth in the Universe	1. The unique nature of the Earth
	III. Nature of the Earth	1. The living shell of the Earth 2. Man and nature
Grade 6 Geography. A beginner's course"	I. Introduction	1. Discovery, study and transformation of the Earth
	II. Structure of the Earth. Biosphere	1. Diversity and distribution of organisms on the Earth 2. Nature complex
	III. World population	1. World population
Grade 7, Geography of continents and oceans	I. Introduction	1. Geographic methods of studying the environment
	II. Main features of nature of the Earth	1. Structure and properties of geographical envelope 2. Natural complexes of land and ocean
	III. World population	1. Population distribution 2. Population and religions of the world 3. Economic activity of people
	IV. Oceans and continents	1. Africa. The influence of humans on the nature. Reserves and national parks 2. African population 3. Countries of northern Africa. Algeria 4. Countries of western and central Africa. Nigeria 5. Countries of eastern Africa. Ethiopia 6. Countries of southern Africa. 7. Australia. The uniqueness of the organic world 8. Oceania. Nature, population and countries 9. South America. Population 10. Countries of the east of South America. Brazil 11. Countries of the Andes. Peru

		12. North America. Natural areas and population. Canada 13. Middle America. Mexico 14. Eurasia (13 lessons, including knowledge of sustainable development)
	V. Geographical envelope – our home	1. Regularities of geographical envelope 2. Interaction of nature and society
Grade 8 Geography of Russia. Nature	I. Peculiarities of nature and natural resource of Russia	1. Dependence of man on climate 2. Water in human life 3. Biological resource of protected areas 4. Natural resource potential
	II. Natural complexes of Russia	1. The diversity of natural complexes of Russia 2. Natural resource of the East-European plain and problems of its rational utilization 3. Natural unique objects. Ecological problems of the Urals 4. Natural resource of the Far East utilized by man
	III. Man and Nature	1. The influence of natural conditions on human life and health 2. Influence of man on nature 3. Rational management of natural resource 4. Russia on the ecological map of the world 5. Ecology and Human Health 6. Geography for nature and society
Grade 9 Geography of Russia. Population and economy	I. General part of the course	1. Russia's position in the world 2. National composition of the population in Russia 3. Population migration. Population in cities and countryside 4. Russia in the modern world economy
	II. Regional part of the course	For study: economical regions of Russia, problems of reclaiming, natural resource, economy (6 lessons)

Since geography in Kazakhstan is taught beginning from Grade 6, it was decided to use the ecology and geography biased Natural Science Grade 5 program and a corresponding schoolbook for knowledge and skills analysis in the sustainable development study area (Table 2).

**Table 2**

Geography program content-related component aimed at forming schoolchildren's knowledge and skills in the perspective of sustainable development, Kazakhstan

<b>Grade, course</b>	<b>Program part</b>	<b>Educational topics aimed at building knowledge and forming skills in the area of sustainable development</b>
Grade 5 Natural Science	I. Introduction	1. Methods of studying nature
	II. The Earth as a planet	1. Water as a unique substance of the planet 2. Importance of water for living systems 3. Water protection

		<ul style="list-style-type: none"> <li>4.The air around us</li> <li>5.Climate and living organisms</li> </ul>
	III. Life in nature	<ul style="list-style-type: none"> <li>1. Diversity of natural phenomena</li> <li>2. A living planet</li> <li>3. Diversity of animals and their relevance</li> <li>4. Diversity of plants and their relevance</li> <li>5. Natural communities</li> </ul>
	IV. Nature and man	<ul style="list-style-type: none"> <li>1.The natural environment</li> <li>2. Placing man in nature</li> <li>3. Natural system as affected by human activities</li> <li>4. Environmental pollution</li> <li>5. How to protect nature</li> <li>6. Protected natural areas</li> <li>7. Reserves of Kazakhstan</li> <li>8. The Red Book</li> <li>9. Rare animal species of Kazakhstan</li> <li>10. Rare plants of Kazakhstan</li> <li>11. How to behave in nature</li> </ul>
Grade 6 Physical Geography	I. Hydrosphere	<ul style="list-style-type: none"> <li>1. Oceans and seas at man’s convenience. Protection of seas and oceans.</li> <li>2. Protection of surface water</li> </ul>
	II. Biosphere	<ul style="list-style-type: none"> <li>1. Diversity of living organisms and patterns of their expansion.</li> <li>2.Impact of living organisms on the Earth’s envelopes</li> </ul>
	III. Geographical envelope	<ul style="list-style-type: none"> <li>1. Geographical envelope as an integrated Earth mantle</li> <li>2.Protection of the natural complexes</li> </ul>
	IV. Human race on the planet	<ul style="list-style-type: none"> <li>1. World population</li> <li>2. Kazakhstan on the map of the world</li> </ul>
	V. Nature and population in your area	<ul style="list-style-type: none"> <li>1. Fauna and flora in your area</li> <li>2. Human population in your area</li> </ul>
Grade 7 Continents and oceans	I. Nature diversity: continents, oceans	<ul style="list-style-type: none"> <li>1. Natural complex</li> </ul>
	II. Continents of the northern hemisphere	<ul style="list-style-type: none"> <li>1. Eurasia. Population and countries (5 lessons)</li> <li>2. North America. Population and countries (2 lessons)</li> </ul>
	III. Continents of the southern hemisphere	<ul style="list-style-type: none"> <li>1. South America. Population and countries (2 lessons)</li> <li>2. Africa. Population and countries (2 lessons)</li> </ul>
	IV. The Earth is our common	<ul style="list-style-type: none"> <li>1. Nature and society: interaction</li> </ul>

	home	2. Population and countries around the world
Grade 8 Physical Geography of Kazakhstan	I. Physio-geographical characteristic of Kazakhstan. Climate	1. Influence of climate on human life and economic activity
	II. Nature protection and resource management in Kazakhstan	1. Natural resource and industries 2. Human ecology. Ecologically friendly and ecologically unfriendly territories. 3. Ecological problems of Kazakhstan 4. Natural change prognosis meaning 5. Reservations of Kazakhstan 6. National parks and wildlife sanctuaries 7. Basics of environmental management and nature protection
Grade 9 Economic and Social Geography of Kazakhstan	I. Introduction	1. Nature and resource potential of Kazakhstan
	II. Population and Labor Resource	1. Ethnic and religious groups in the population of Kazakhstan
	III. Kazakhstan in the world today	1. Kazakhstan in the world economy
	IV. Nature and society interaction	1. Natural environment, landscapes and man 2. Society and Nature: from dominance to harmonious interaction

### 3.1. Discussion

Geography as a school curriculum discipline readily provides a possibility of ecologizing study content as well as implementing the concept of sustainable development in many countries of the world (Esteves, 2015). Its contents promote the formation of ecological culture in schoolchildren either as part of the curriculum or in extra-curricular time (Bakirova and Seilkhan, 2014; Norcup, 2015). It is enough to mention that upbringing an ecology-conscious culture subject with the relevant level of ecological thinking relies on the knowledge about geographical peculiarities of nature, population and economy of Russia and the world in Russia schools' curricula. Techniques and technologies of environment preservation and sustainable utilization comprise the set of main objectives of the compulsory part in the general basic education program of geography as a school subject (Barinova et al., 2012). In addition, sustainable development related approaches such as nature utilization and environmental protection, practical significance of geography methods in cognition and transformation of the world, common human values and regional self-identification, nature as a system, humanization of nature-man-economy relationship and ways to implement them, emotion and value related targets form the basis when developing school program on geography.

Similar approaches and objectives of school geography education – as far as sustainable ecology-related component area is concerned within sustainable development paradigm – are found in school subject state programs of other countries, Kazakhstan being the theme of the case study below.

It was in 1992 that Kazakhstan undertook obligations in fulfilling tasks stipulated by the Agenda 21 and supported the Millennium Declaration (New York, 2000) and the Johannesburg Declaration on Sustainable Development" (2002). The ideas of sustainable development are reflected in the Kazakhstan Development Strategy till 2030, Concept of

Kazakhstan Ecological Safety, Strategy for the Territorial Development of the Republic of Kazakhstan, Concept of Kazakhstan Transition to Sustainable Development during 2007-2024.

The transition to sustainable development called for projecting a new education model, "Education for Sustainable Development". Based on the model, the Concept of Ecological Education in Kazakhstan was created, wherein the notions of "ecological culture", "ecological education" were defined (CEE RK, 1998). Ecological education is regarded as an integral process and a result of acquiring systematic knowledge and developing skills and aptitudes gained in the respect to careful human interaction with environment and forming responsibility for consequences of environment changing. The Environmental Code of Republic Kazakhstan (2007) was a normative document to follow in the line of ecological development ordinance, wherein the notion of ecological education was revised and defined as an continuous process of upbringing, teaching, self-study and personal development aimed at forming a system of knowledge and skills, core values, ethic and esthetic relations to stimulate personal responsibility for the environmental condition (EC RK, 2007). Formation of geographic and ecological culture of an individual, value related attitude to the environment, regulating behavior of a school student in the process of "man-nature-society-culture" relationship, environmental protection and conservancy of nature appear to be the target of geographical education in Kazakhstan. Activity-centered approach is the main one in accomplishing the education tasks, research and the project work of the school students are the leading methods in achieving the targeted objectives.

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## 4. Conclusions

Studying the potential of the contents of compulsory school geography course books and programs in Russia and Kazakhstan in terms of implementing the ideas of sustainable development enables the authors to draw the following conclusions:

- 1) the knowledge in the area of sustainable development forms part of all schoolbooks on geography in both countries;
- 2) the content of school-bound geographical knowledge has a predominately ecological character in both countries; however, it should be noted that Kazakhstan geography programs for grades 5 and 8 include separate units entirely dedicated to environmental knowledge ("Nature and Man", "Nature protection and resource management in Kazakhstan"; while in respective Russian schoolbooks, the similarly oriented units include social and economic aspects (grades 7 and 9) in addition to environmental awareness;
- 3) being problem-oriented in character, the relevant testing tasks tend to promote the implementation of activity-centered approach in learning; besides, they include series of project and research oriented tasks;
- 4) main terms and concepts, relating to the topic of sustainable development, such as "ecology", "ecological problems", "rational nature management", "sustainable development", "specially protected natural areas", "environmental protection", "environmentally friendly territories" are taught as part of study materials;
- 5) the volume of material dedicated to the problem of sustainable development in a "classical line" geography program (grades 5-9) accounts for 23.18% of total geography curriculum time in Russia and 16.7% in Kazakhstan, respectively;
- 6) most of curriculum time planned for covering sustainable development related issues in Russian schools falls on Grade 7 geography course (35 lessons out of 68 in total); in schools of Kazakhstan it is Grade 5 geography course (20 lessons out of 68 in total).

Summarizing the problem studied, it can be stated that sustainable development ideas form part of geography course program materials at compulsory school both in Russia and Kazakhstan; dominant volume of this environmental knowledge is aimed to promote the formation of ecological culture in schoolchildren.

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