

THE ROLE OF ECOLOGY IN THE REPUBLIC OF UZBEKISTAN

¹Egamberdiev N. B., ²Alimova M. I.

¹Professor at Tashkent Institute of Irrigation and Agricultural Mechanisation Engineers, Professor

²PhD student at Tashkent Institute of Irrigation and Agricultural Mechanisation Engineers

Abstract. *The role of ecology enhances every single day in our planet Earth. Certainly, proper actions are being taken in the Republic of Uzbekistan too.*

Keywords: *ecology, Presidential Decrees, the Republic of Uzbekistan, Red Book, polygons, SCEEP, Convention.*

<https://doi.org/10.5281/zenodo.7523576>

Introduction

In recent years, the development of ecology as a science has increased the theoretical and practical importance of such earth sciences as meteorology, climatology, hydrology, soil science, oceanology, geophysics and geology. Ecology has the potential of “interdisciplinary” scientific activity, focuses all sciences on the resolution and search for harmony in the relations of all mankind and nature as a whole. (2021, A.Sh. Kaipnazarov, The role of ecology as a science in the social and economic development of Uzbekistan)

Literature review

In total 22 articles were downloaded and analyzed, including foreign articles.

Analysis and results

There are a lot of Presidential Decrees, which provides sustainable development of our country:

1 Decree of the President of the Republic of Uzbekistan of November 29, 2017 No. PD-5264 "On the establishment of the Ministry of Innovative Development of the Republic of Uzbekistan

2 Decree of the President of the Republic of Uzbekistan dated February 16, 2017 No. PD-4958 "On further improvement of the system of postgraduate education

3 Decree of the President of the Republic of Uzbekistan dated December 29, 2016 No. PD-4907 "On measures to further improve and stimulate the activities of academicians of the Academy of Sciences of the Republic of Uzbekistan

4 Decree of the President of the Republic of Uzbekistan dated April 17, 2019 No. PD-4291 "On the approval of the strategy on solid waste management in the Republic of Uzbekistan for the period 2019-2028"

5 Decree of the President of the Republic of Uzbekistan dated September 29, 2020 No. PD-4845 "On measures for further improvement of the activity management system in the sphere of management with household and construction waste"

6 Decree of the President of the Republic of Uzbekistan dated December 28, 2020 No. PD-4937 "On measures to implement the investment program of the Republic of Uzbekistan for 2021-2023"

In Decree of the President of the Republic of Uzbekistan dated April 17, 2019 No. PD-4291 “On the approval of the strategy on solid waste management in the Republic of Uzbekistan for the period 2019-2028” claimed:

In total 221 polygons function on the territory of the Republic of Uzbekistan.

As part of the implementation of the Strategy, 167 landfills with a total area of 1,108.6 hectares will be closed and reclaimed in the conditional regions for solid waste management. On the site of the existing landfills, 54 modernized landfills with a total area of 693.3 hectares will be created and 5 new landfills with a total area of 80 hectares will be opened.

As a result of the optimization measures taken, the number of landfills will decrease from 221 to 59 units, which is equivalent to 770.2 hectares of area, or 50 percent of the area used for storage of solid waste.

So, in the period from 2020 to 2028, the closure and subsequent reclamation of landfills (dumps) that are not subject to further operation will be carried out, and in the period until 2028, modernization will be carried out, providing for the equipment of landfills with protection systems against negative impact on the environment and the health of citizens.

Uzbekistan has been a party to the 1992 Convention on Biological Diversity (CBD) since 1995. The State Committee on Ecology and Environmental Protection (SCEEP) is the competent authority for the CBD. In accordance with CBD requirements, Uzbekistan has prepared national reports on the state of biodiversity and a thematic report on protected areas (PAs). (2020 Environmental Performance Reviews Uzbekistan Third review)

Approved in October 2019, the Concept on Environmental Protection until 2030 (2019 Decree of the President No. 5863) is a totally new document for Uzbekistan that sets long-term goals in environmental protection and measures to achieve them. The Concept provides for measures in the following areas: global environmental issues and the development of international cooperation; desertification and land degradation; water conservation; air protection; conservation of biological resources and increase in forest cover; industrial waste; greening the economy; economic mechanisms of environmental management; state environmental control; SEE and eco-certification; environmental monitoring; science; participation of civil society in environmental protection and the creation of a continuous system of environmental education. Part of the tasks and activities provided for by the Concept reflect tasks and activities already provided for in previously approved documents, but some of the tasks and activities are new. This is especially true for measures envisaged under air protection, industrial waste, greening the economy, state environmental control, SEE and public participation. Among others, target indicators for 2030 include:

Bringing the area of forest plantations in the Uzbek part of the Aral Sea to 60 per cent of its territory;

Improving the efficiency of wastewater treatment up to 80 per cent;

An increase in the forest fund lands covered by forests to 4.5 million hectares;

Increase in the area of protected natural territories of categories I–V to 12 per cent;

Bringing the coverage of the population with services for the collection and disposal of municipal solid waste (MSW) to 100 per cent.

The implementation of the Concept is expected through the adoption of “roadmaps” for a three-year period. The roadmap for the period 2019–2021 (2019 Decree of the President No. 5863) contains a list of 41 activities.

(2020 Environmental Performance Reviews Uzbekistan Third review)



Figure 1. Uzbekistan on the map of Central Asia

2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity

Uzbekistan borders with Kyrgyzstan, Tajikistan, Turkmenistan, Kazakhstan.

Uzbekistan lies between the two major Central Asian Rivers, the Amudarya and the Syrdarya. According to the criteria of the UNESCO world map of desertification and the UN convention to combat desertification, the country has an aridity index from 0.03 to 0.20, and is situated in the arid region, which is subject to intensive desertification and droughts (Fig. 2) (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

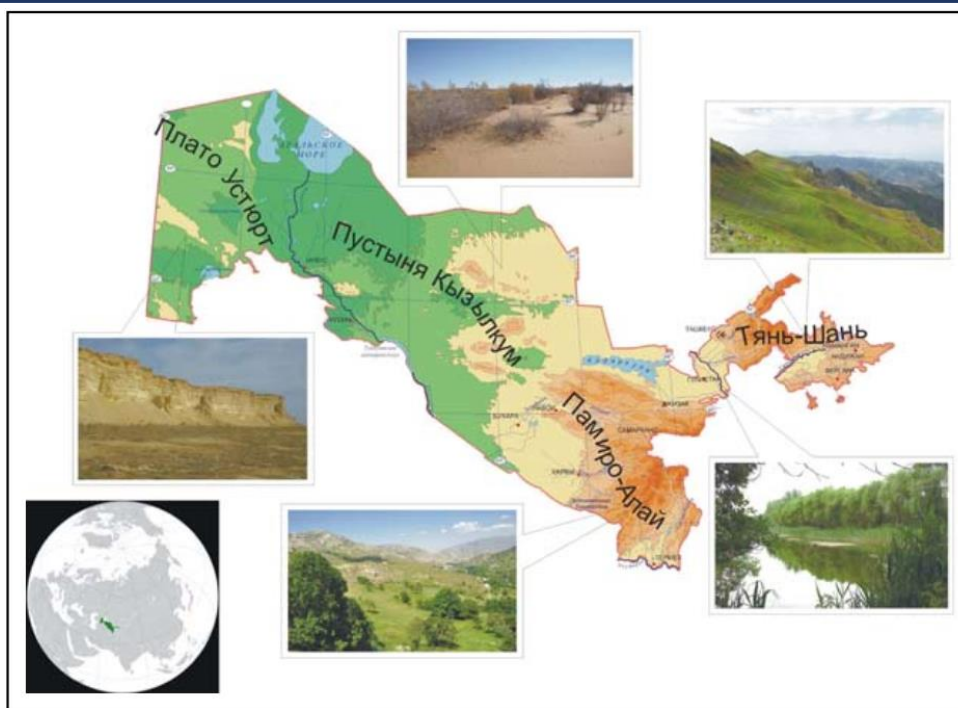


Figure 2. Physiographic map of Uzbekistan

2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity

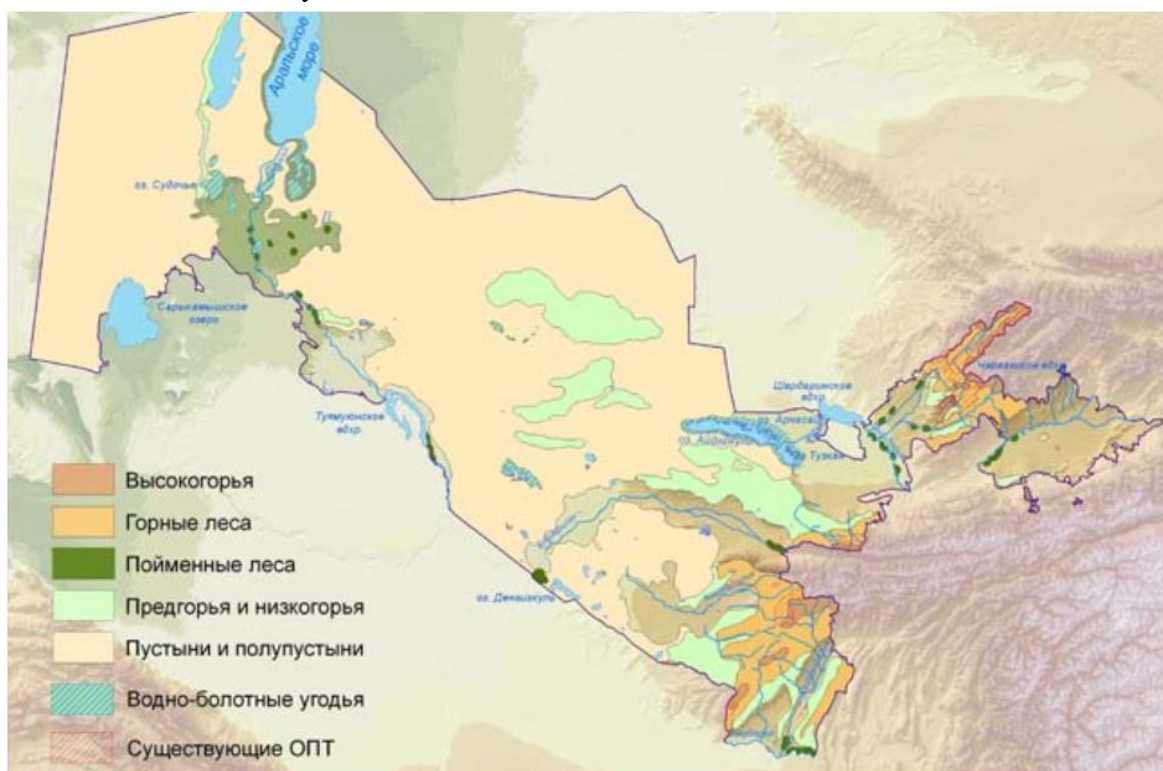


Figure 3. The main natural ecosystems of Uzbekistan

2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity

Uzbekistan's position at the junction of several Central Asian bio-geographical regions predetermines a significant richness of its flora and fauna. At the same time, it is a reflection of the diversity of natural conditions in Uzbekistan, where vast plains occupied by different types of

deserts, mountain steppes, forests and alpine meadows, tugai thickets and waterbodies form characteristic ecosystems (Fig. 3). (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

Useful wild plants in the flora of Uzbekistan

Groups of plants according to their use	Families	Number of species
Food plants	<i>Rosaceae, Amaryllidaceae, Juglandaceae, Rhamnaceae</i>	More than 350
Fodder plants	<i>Poaceae, Fabaceae, Chenopodiaceae, Asteraceae</i>	1700
Medicinal plants	<i>Ranunculaceae, Lamiaceae, Rosaceae, Boraginaceae, Apiaceae u ðp, Astcraceae, Peganaceae</i>	More than 800
Ether-oil plants	<i>Lamiaceae, Apiaceae</i>	650
Dye plants	<i>Malvaceae, Papaveraceae, Asteraceae</i>	150
Ornamental plants	<i>Liliaceae, Asphodelaceae, Iridaceae, Amaryllidaceae, Rosaceae, Asteraceae</i>	270
Culinary herbs and Spices	<i>Lamiaceae</i>	200
Saponin plants	<i>Fabaceae</i>	100

Table 1 2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity

The flora of Uzbekistan is diverse in ancestors and wild relatives of cultured plants (Tab. 1). Of special interest are wild relatives, which are of the greatest importance to cultivation of new and improvement of existing valuable cultivars. This includes the species: *Juglans regia* L., *Amygdalus communis*, *Amygdalus bucharica* Korsch., *Diospyros lotus* L., *Ficus carica* L., *Punica granatum* L., *Pyrus turcomanica* Maleev, *Malus sieversii* (Ledeb.) M. Roem., *Vitis vinifera* L., *Ziziphus jujube* L., *Pistacia vera* L. etc., which are mainly concentrated in the mountainous regions of Uzbekistan. (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

Table 2.

The level of endemism in the fauna of the terraneous vertebrate animals

Class	Number of taxa (species, subspecies)		% of the total number
	Total	Endemics	
Reptiles	60	30	50,0
Birds	460	8	1.7
Mammalians	107	15	14,0
Total	627	53	8,5

2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity

According to modern data sources, the basis of fauna of Uzbekistan consists of 14,900 invertebrate species (850 protozoa species, 61 species of annelids, 1179 species of roundworms, 533 species of flatworms, 223 mollusks species, and 12,000 arthropod species) and 714 species of vertebrate animals (84 -species of fish, 3 species of amphibians, 60 species of reptilians, 460 avian species and 107 mammals species). Such a diversity of species is the reflection of different historical ways of formation of the fauna of the country and of diversity of its geographical conditions. (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

So far, 53 species and subspecies of terraneous vertebrate animals representing the complex of endemics of Uzbekistan and Central Asia are known. Endemics constitute 8.5% of the entire number of species (subspecies) of terraneous vertebrate animals. The fauna of reptiles is noted for the highest level of endemism: up to 50% of all species of this class. The class of mammals is noted for the lower level of endemism - 14% as well as class of birds is also noted for its low level of endemism - 1.7% (Tab. 2). (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

Table 3.
The number of the Red Data Book plant species of different categories of rareness in nature reserves and nature parks

Name of protected area	Number of plant species included into the Red Data Book of Uzbekistan (2009)				
	Status 0	Status 1	Status 2	Status 3	Total
Nature reserves					
Gissar	-	8	12	4	24
Zaamin	1	4	10	4	19
Zeravshan	-	-	-	1	1
Kitab	-	6	8	5	19
Kyzylkum	-	-	1	-	1
Nurata	-	6	24	3	33
Surkhan	-	9	25	5	39
Chatkal	-	5	19	7	31
Natural parks					
Zaamin	-	1	7	3	11
Ugam-Chatkal	2	17	36	6	61

2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity

Characteristics of distribution of rare plant species having different categories of rareness within the protected areas are given in Table 3. Nature reserves and national parks in Uzbekistan shelter 152 (47,4%) of 321 species of endophytes that are included into the Red Data Book of Uzbekistan. The highest number of rare species is recorded in the territory of the Ugam-Chatkal national park and the Surkhan nature reserve. (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

The integrated protection of biodiversity is carried out mainly in the territories of the Strict Nature Reserves (Ia – IUCN category). Strict Nature Reserves (zapovedniks) shelter about 50% of the species diversity of the vertebrate animals. On average, as many as 22.8% of the vertebrate

animal species are protected in the mountain nature reserves. The flatland-tugai nature reserves shelter about 40%. The National Parks (Ugam-Chatkal and Zaamin) support mainly the conservation of biodiversity of mammals species in the mountain nature reserves adjacent to their territories. (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

Table 4.
Distribution of rare and endangered vertebrate species in the PAs system

Class	Number of species included into the Red Data Book of Uzbekistan (2009)	number / % of the total number of species included into the Red Data Book of Uzbekistan		
		Nature reserves*	Natural parks	Total of PA (I-IV categories of IUCN)
Fish	18	12/66,7	3/16,7	13/72,2
Reptiles	16	6/37,5	4/25,0	11/68,8
Birds	48	20/40	13/27	43/90,0
Mammalians	25	16/64,0	9/36,0	18/72,0
Total	107	77/72,0	26/24,5	85/79,4

*Note: taking into account the area of the former nature reserve Badai-Tugai, which was included into the nature reserve zone of the Lower- Amudarya biosphere reserve (Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 243 of 26 August, 2011).

The analysis of modern state, distribution across the territory of the country and level of protection of rare and endangered species of vertebrate animals suggests that the territorial form of protection covers about 80% of vertebrate animals included into the Red Data Book of Uzbekistan (Tab. 4). (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

The total number of rare and endangered species protected in the species management areas zakazniks, which shelter 41,9% of the total number of species in this category. Reptiles inhabiting the sandy massifs of the Ferghana Valley prevail in the territories of the nature monuments.: 31,2% of reptile species included into the Red Data Book of Uzbekistan were recorded in that area. (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

The main types of natural ecosystems in PAs are represented disproportionately. The PAs system covers about 3,5% of desert ecosystems, about 3,0% of floodplain forests and 14% of mountain ecosystems. (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

The PAs system provides a high level of protection to only separate types of natural habitats, namely mountain forests and high mountains. For others, e.g., desert and foothill habitats, and floodplain forests, the areas of nature reserves are insufficient for a normal support of species breeding and communities inhabiting these habitats. (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

The Red Data Book of Uzbekistan is the main document containing the aggregate information on the state of rare, reducing in population size and endangered species of plants and animals in the territory of Uzbekistan. (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

The first edition of the Red Data Book of the Republic of Uzbekistan (1984) included 163 species of plants; the second edition (1998), 301 species; the third edition (2006), 302 species of higher plants and 3 fungi species; the latest fourth edition (2009), 321 species of higher plants and

3 fungi species. (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

The first edition of the Red Data Book of the Republic of Uzbekistan (1983) included 63 species; the second edition (2003), 184; the third edition (2006), 184; the fourth edition (2009), 184 animal species and subspecies. (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

In the last 10-15 years, according to IUCN, the threat of extinction of species in the wild has grown for a number of species and subspecies, which is connected with the reduction of their habitats and decline in population size. This primarily concerns hoofed mammals as the most vulnerable and susceptible to anthropogenic influences of components of fauna. (2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity)

Conclusion/Recommendations

Conduction of environmental monitoring monthly, quarterly, yearly is one of the crucial aspects. Educating next generation, keeping clean, protecting ecology is in our hands!

REFERENCES

1. <https://cis-legislation.com/document.fwx?rgn=112949>
2. <https://cis-legislation.com/document.fwx?rgn=120270>
3. http://www.cawater-info.net/water_world/uzbekistan_e.htm
4. 2015 GEF UNDP SCNP Fifth national report of the Republic of Uzbekistan on conservation of biodiversity
5. 2016 Republic of Uzbekistan: Tashkent Province Water Supply Development Project
6. 2021 A.Sh. Kaipnazarov The role of ecology as a science in the social and economic development of Uzbekistan
7. 2020 Environmental Performance Reviews Uzbekistan Third review
8. European University Association. (2006). Quality Culture in European Universities: A Bottom-Up Approach.
9. Naqvi, N. H., & Kheyfets, I. (2014). Uzbekistan: Modernizing Tertiary Education.
10. UNESCO. (2013). The International Standard Classification of Education 2011. Comparative Social Research.
11. [http://doi.org/10.1108/S0195-6310\(2013\)0000030017](http://doi.org/10.1108/S0195-6310(2013)0000030017)
12. Wan Endut, W. J., Abdullah, M., & Husain, N. (2000). Benchmarking institutions of higher education. Total Quality Management, 11(4-6), 796-799. <http://doi.org/10.1080/09544120050008237>
13. <http://unesdoc.unesco.org/images/0023/002354/235406e.pdf>
14. 2018 Profiles of women scientists in Asia
15. 2014 Nilanjana Dasgupta¹ and Jane G. Stout Girls and Women in Science, Technology, Engineering, and Mathematics: STEMing the Tide and Broadening Participation in STEM Careers
16. Ates, G., Holländer, K., Koltcheva, N., Krstic, S., & Parada, F. (2011). Eurodoc Survey I: The First Eurodoc Survey on Doctoral Candidates in Twelve European Countries. Brussels: Eurodoc.

17. Byrne, J., Jørgensen, T., & Loukkola, T. (2013). Quality Assurance in Doctoral Education – results of the ARDE project. Brussels: European University Association.
18. ENQA. (2015). Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG). Brussels: EURASHE.
19. EUA. (2010a). Salzburg II recommendations. European Universities Achievements Since 2005 in Implementing the Salzburg Principles. Brussels: European University Association.
20. EUA. (2010b). Trends 2010: A decade of change in European Higher Education. Brussels: European University Association.
21. European Commission. (2008). The European Qualifications Framework for Lifelong Learning (EQF).
22. European Commission. (2011). Principles for Innovative Doctoral Training. Brussels.