

# Education For Sustainable Development And Case Study Tasks On Some Endemic Plant And Animal Species

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**Abstract-** Education for sustainable development with the collaboration of the State Committee for Nature Protection, Ministry of Public Education and the Ministry of Higher and Secondary Specialized Education of the republic of Uzbekistan was adopted and stages of sustainable development are represented. Besides environmental problems of the south Uzbekistan region are closely illustrated with the case study tasks of the endemic plant species in the article.

**Index Terms-** sustainable development, education, case study, endemic, plant, degradation, Uzbekistan, ecology, environmental education, program, assessment.

## I. INTRODUCTION

For Central Asia countries, as UNECE (United Nations Economic Commission for Europe) members, it is known that "...sustainable development is a complex issue, encompassing economic, environmental and social dimensions. In other words, development is essential to satisfy human needs and improve the quality of human life. At the same time, development must be based on the efficient and responsible use of all of society's scarce resources - natural, human and economic". It is important to outline the following goals of the UNECE Strategy on ESD (Education for sustainable development): Ensure that policy, regulatory and operational frameworks support the promotion of ESD; Promote SD (sustainable development) through formal, non-formal and informal learning; Equip educators with the competence to include SD in their teaching; Ensure that adequate tools and materials for ESD are accessible and Promote research on and development of ESD<sup>1</sup>.

The most significant achievement of Uzbekistan in 2011 in the field of ESD was adoption by Resolution No.20/2/305 (dated 19<sup>th</sup> June, 2011) on "Concept education in purpose of sustainable development" with participation of the State Committee for Nature Protection, Ministry of Public Education and the Ministry of Higher and Secondary Specialized Education. Environmental problems of Uzbekistan regions are closely connected with the decrease of the natural landscape's productivity, depletion of water systems and soil erosion. Education is a key tool for a transition to sustainable development through the forming of knowledge, skills, abilities and the opinions of people required for their active participation towards sustainable development and an interconnected solution to economic and social challenges in accordance with the requirements of environmental protection ([www.carec.kz](http://www.carec.kz)). In Uzbekistan, curricula, programs and standards of formal education reflect educational strategies supporting only EE (Environmental education) as one of the ESD components. The program, "World surrounding us", is taught in first and second grades and integrated into such subjects as botany, biology, chemistry, geography and others. Non-formal ESD is implemented preferably through non-governmental organizations and non-commercial organizations in the Republic of Uzbekistan. Non-governmental organizations actively working in ESD sphere include the [www.ecomaktab.uz](http://www.ecomaktab.uz), [www.econews.uz](http://www.econews.uz), [www.uznature.uz](http://www.uznature.uz) and others. So this article includes of the environmental education and nature protection through studying case study tasks and it helps to students to develop viewpoints of students to sustainable development of the country.

<sup>1</sup> [www.carec.kz](http://www.carec.kz) Progress review on education for sustainable development in central Asia: achievements

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## II. METHOD OF RESEARCH

In the higher educational institutions, we can use case study tasks, brain storming, modular learning technologies to develop viewpoints of students for sustainable development, because one of the most promising learning systems is that it is best adapted to the system for developing students' cognitive and creative abilities [7]. In traditional education, the learning objectives are expressed through pedagogical activity, that is, education, while the modular learning, case study, brain storming are expressed through the activities of the learners and focuses on professional activities.

## III. RESULTS AND THEIR DISCUSSION

The key strategic ideas for sustainable development in Uzbekistan are reflected in the following strategic and program documents, such as: Nukus Declaration of Central Asian States and the International Community on Sustainable Development of the Aral Sea Basin (September 5, 1995); The Decree of the President of the Republic of Uzbekistan dated on May 20, 2011 № PD (President Decision)-1533, that about "On measures to strengthen the material and technical bases of higher education institutions and improve the quality of training of highly qualified specialists"; National Action Program for 2003-2015 under the UNESCO the project of "Education for All"; National Action Plan on the protection of environment noted for 2008-2012; The decision of the Cabinet of Ministers of the Republic of Uzbekistan dated on May 27, 2013, № 142, "On the Program of Action for the Protection of Environment in the Republic of Uzbekistan for 2013-2017"; The decree of the President of the Republic of Uzbekistan of "About Strategy of Action for the Future Development of the Republic of Uzbekistan" in February 7, 2017, №PD-4947 will be based to develop the sustainable development education [1,2,3,4,5,6].

The main purpose of Sustainable Development Education is to integrate the ideas and principles of sustainable development with all forms and stages of education, and to educate those who are able to think independently, critically, socially, economically, and environmentally and actively.

And promoting the development of new activities including nanotechnology for scientific activities and sustainable development [8,9] is one of the main activities. In sustainable development education, for example, in ecology teaching we can use the case study tasks. Assessment of students' knowledge,

skills and abilities are obtained on the basis of case study test tasks in ecology and nature protection. Some case study tasks are given in the followings.

### Reflection I

*In the following, there are theoretical materials, you should read it and describe your viewpoints on the case study tasks into tables:*

There are about 4500 species of wild higher plants and over 2000 species of fungi in the territory of Uzbekistan. About 400 of them are rare, endemic and relict species (10-12% of flora). Effective measures are necessary for their protection. Although the status of flora protected in the reserves is rather good, natural stocks of wild species have sharply reduced. The current state of coenotic (cenotic) populations of 5 plant species were listed in the Red Book of the Republic of Uzbekistan from the territories of the Kashkadarya region, such as: *Dianthus uzbekistanicus* Lincz., *Eremurus robustus* (Regel) Regel, *Salvia lilacinocoerulea* Nevski., *Iris magnifica* Vved., *Tulipa fosteriana* W. Irving. So their reproduction are not available.

During the field research, two coenotic populations of *D. uzbekistanicus* were studied (Figure 1.). Both coenopopulations grow in the Zeravshan ridge, in the area of the Takhta-Karachi pass.

The first coenopopulation of *D. uzbekistanicus* was studied on the northwestern slopes of the Zeravshan ridge (Takhta-Karach pass) as part of the wheatgrass community on a typical serozem (Figure 1.). The total projective cover of the grass stand is 80%. The high density of grass stands is associated with the absence of anthropogenic impact (the described site is located in a fenced area). In this case, the share of the studied species does not exceed 5%. The floristic composition of the community is quite rich and it consists of 33 species of vascular plants (Table 1.). But this index is not sustainable because of anthropogenic influence.

The second coenotic population of *Dianthus uzbekistanicus* grows on the southwestern slopes of the Zeravshan ridge (in the vicinity of the Takhta-Karach pass) as part of a herb-wormwood community. *Artemisia tenuisecta*, *Elytrigia trichophora*, and *Hypericum perforatum* predominate in the plant community. The soil is coarse-grained. The total projective cover of the grass stand does not exceed 36%, and the projective cover of the studied species in this community barely reaches 2%. The floristic composition of the community consists of 19 species of vascular plants, the vast majority of which are perennials (47%).



Figure1. *Dianthus uzbeckistanicus*

Table 1. – The species composition and their abundance of grassland-hawthorn community

No.	Name of the plants	Life form	Projective cover, %
1	<i>Crataegus turkestanica</i>	Tree	10
2	<i>Rosa sp.</i>	shrub	2
3	<i>Acantholimon sarawschanicum</i>	A little shrub.	+
4	<i>Thymus seravschanicus</i>	Semi-shrub	3
5	<i>Ziziphora clinopodioides</i>	Semi-shrub	2
6	<i>Elytrigia trichophora</i>	perennial	16
7	<i>Stipa sp.</i>	perennial	5
8	<i>Hypericum perforatum</i>	perennial	8
9	<i>H. scabrum</i>	perennial	8
10	<i>Centaurea squarrosa</i>	perennial	2
11	<i>Helichrysum mussae</i>	perennial	+
12	<i>H. maracandicum</i>	perennial	2
13	<i>Plantago lanceolata</i>	perennial	3
14	<i>Tragopogon sp.</i>	perennial	+
15	<i>Salvia serawschanica</i>	perennial	+

Continuation of Table 1.

16	<i>Astragalus sewerzowii</i>	perennial	2
17	<i>A. mucidus</i>	perennial	3
18	<i>Ferula kuhistanica</i>	perennial	+
19	<i>Galagania fragrantissima</i>	perennial	2
20	<i>Dianthus uzbeckistanicus</i>	perennial	5
21	<i>Eremurus olgae</i>	perennial	1
22	<i>Gagea sp.</i>	perennial	+
23	<i>Lindelofia macrostyla</i>	perennial	+
24	<i>Delphinium semibarbatum</i>	perennial	+
25	<i>Potentilla sp.</i>	perennial	+
26	<i>Convolvulus lineatus</i>	perennial	+
27	<i>Aster canescens</i>	perennial	+
28	<i>Ixiolirion tataricum</i>	perennial	+

29	<i>Poa bulbosa</i>	perennial	5
30	<i>Verbascum songaricum</i>	Two-year	+
31	<i>Bromus macrostachys</i>	annual	1
32	<i>Veronica stylophora</i>	annual	+
33	<i>Lappula sp.</i>	annual	+

**Reflection II**

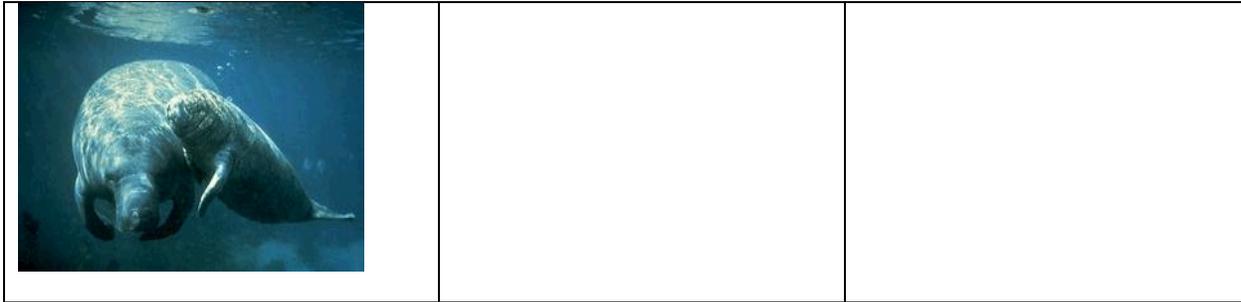
So, desertification of pasture ecosystems is one of the essential problems in Uzbekistan. It became apparent through increase of barchans area; increase of extremely saline soils with lighted plant; communities of hyper halophytic species; vanishing of shrubby dominants with final sinuses of ruderal plants (*Peganum harmala*, *Karelinia caspica*, *Aeluropus litoralis*, *Limonium otolepis*). Billions of dollars are spent for restoration of Aral Lake and for an improvement of this ecological catastrophe, but situation has not changed much, and water level is still going down.

Now we should fulfill following tasks:

<i>Case study task 1.</i>		
Types of problems	Origin of the problems	To inhibit the problems
Represent the decreasing of endemic plant species in the South Uzbekistan		
Arising of degradation		

<i>Case study task 2.</i>		
Types of problems	Origin of the problems	To inhibit the problems
Desertification of pasture ecosystems		
Sand movement		

<i>Case study task 3</i>		
Some threatened species	Ways that species become Endangered	What can you do to help endangered species?
<p>✓ <b>The spotted owls</b></p>  <p>✓ <b>Tigers</b></p>  <p>✓ <b>Manatee or sea cow</b></p>	<ol style="list-style-type: none"> <li>Habitat loss</li> <li>Unregulated or illegal killing or collection</li> <li>Pesticides, pollution</li> <li>Competition with other species</li> <li>Disease</li> <li>Predation</li> </ol>	<ol style="list-style-type: none"> <li>Get educated about local endangered species.</li> <li>Visit a nearby national wildlife refuge or nature center.</li> <li>Volunteer.</li> <li>Don't buy species illegally taken from the wild.</li> <li>Don't buy products made from threatened or endangered species.</li> </ol>



#### IV. CONCLUSION

Education for sustainable development offers many opportunities for students. As a result of the integration of science, each student feels the essence and content of environmental problems. Their creativity is enhanced by doing case studies during the course. They are able to think and understand that each species has its own role in nature. So, it is necessary to generalize and enlarge of ESD in Uzbekistan. In this process it is demanded to publish teaching materials by using of foreign news on ecology and ESD. At last, we should note and work out the plans on ecological events and celebrate eco-dates at educational institutions.

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