



Tempus

**UZWATER**

---

**Master in environmental science and sustainable  
development with focus on water management for Uzbekistan  
higher education**

# **Sef-Evaluation Report**

**partner universities in Uzbekistan**

**2016**

## Content

1. Rationale	2
2. Samarkand Agricultural Institute (SAI)	3
3. Samarkand State University (SSU)	12
4. Samarkand State Architectural and Civil Engineering Institute (SSACEI)	18
5. National University of Uzbekistan (NUUz)	18
6. Tashkent Technical University (TTU)	26
7. Urgench State University (UrSU)	26
8. Bukhara State University (BSU)	33
9. Karakalpak State University (KKSU)	43

## **1. Rationale**

The report describes context of UZWATER Master Programme implementation at each partner university in Uzbekistan, academic staff available for realisation of the Study programme, facilities purchased from the TEMPUS grant.

The presented evaluation data analyse number of students in the Master Study Programme as well as number of students in the courses (per course, per semester, per academic year).

The report also describes Study Programme management and quality assurance system, provides information on internal evaluation of Master Programme and courses, and presents feedback from the students, teachers and administrative staff.

## **2. Samarkand Agricultural Institute (SAI)**

### **2.1 Programme Summary**

The SAI involved in all project activities since institution is leader for thematic group of Environmental and green economics. The project team was established from first year of activities.

Members of project team trained for history, environment and culture of EU partners, educational system, ECTS, development of curriculum aligned with Bologna process, comparison with educational system in Uzbekistan, concepts of development of environmental science study programs, Fundamentals of Ecology, Environmental Technology, Ecological and Environmental Economics, Green Economy Agricultural Water Management, Irrigation Methods and Strategies, Research Methodology and Theory of Science. These modules were updated on shared responsibility principle with other partners of project. These subjects were introduced at SAI at the pilot 2014-2015 academic year. Also, EU partners provided 1 week training at SAI to eliminate missing skills and knowledge of faculty on teaching new program. The updated curricula is approved by scientific council of SAI. Harmonized curricula consists only part of whole curricula, covering specialized and professional subjects, while general subjects remaining.

During 2013, 4 faculty members visited EU partner universities for 1 week. Curricula and syllabi of core courses of Master Programme finished. Teams were formed for all core courses. Description of courses are ready. Compendia for courses Green Economics and Sustainable development in English and Uzbek is finished. Study centre established as co-financing and equipped from Tempus, literature is collected. Head of project team at SAI Dr. Ganiev got continued training at EU partner universities. Intensive teaching periods by EU teachers as the new Master Programme held at SAI on Sept 2014.

At 2014-2015 academic year, modules of Fundamentals of Ecology, Environmental Technology, Ecological and Environmental Economics, Green Economy Agricultural Water Management, Irrigation Methods and Strategies, Research Methodology and Theory of Science with updated syllabi launched to teach at pilot stage for in total 1700 students. Group of authors finished development of textbook "Environmental and green economics".

## 2.2 Academic staff available for realisation of the Study programme/courses

Academic staff:

- Percentage of teachers who are ‘Doctors’, 42% ;
- Academic categories of the faculty available: assistant teacher, teacher, senior teacher, docent, professor;
- In the case of public universities: number of Professors (CU), number of Holders University (TU or CEU, TEU) and contract (Contract Doctor, Associate Doctor and Assistant Doctor, Assistants, Associates, seats linked to clinical specialties, etc.), 5 years contract according to scientific boards decision, other case every year 1 year contract;
- Total number of full-time academic staff and percentage of dedication to the degree, 59/42%;
- Total number of part-time academic staff and hours/weeks of dedication to the degree 7 part time staff, 770 hours per year.

List of academic staff and their competences for implementation of study courses in SAI.

<b>№</b>	<b>Full name</b>	<b>Position, knowledge and experience within the topic of the project</b>
1	Farhod Ahrorov (Coordinator)	Dean of faculty Economics and Management & Dr. of Agricultural Economics in the Department of Agricultural Economics and Management. As beneficiary of different projects has been different Institutions in abroad and have big experience in field of international project activities. Alumni of Erasmus Mundus External Cooperation Window program, under which had postdoctoral fellowship at Free University Brussels (Belgium).
2	Ibragim Ganiev (Head of work group in SAI)	Dr. of Agricultural Economics, deputy dean of the department. Have a big experience in educational area and participated different projects. Responsible to education, curriculum development, works to monitoring board on educational processes at the Institute, senior researcher. Author of more than 40 scientific papers and other publications.
3	Shavkat Hasanov,	Head of International department, Dr. of Agricultural Economics in the Faculty of Agricultural Economics & Management. Member of European Agricultural Economists Association. Has been in different Institutions in abroad and have big experience in this field. Responsible to International affairs at the Institute, senior researcher. Author of 30 scientific papers and other publications.
4	Babur Eshonkulov	Assistant-Professor of Genetics, Selection and Seed growing Department SAI. He have got master level in University of



		Weihenstephan–Triesdorf. His scientific area is environmental science and ecology.
5	Komil Muminov	Professor, Dr. Head of Agriculture and Melioration Department SAI. He was dean of agronomy faculty since 1998-2004. He is managed some national projects. Author of more than 150 scientific papers, textbooks and other publications.
6	Alisher Maxmatmurodov	Dr., Head of Agrochemistry, Soil Science and Plant Protection of the Plants Department SAI. He is manager of some national projects. Author of more than 50 scientific papers and other publications.
7	Golib Sanaev	Dr., Associated-Professor in the department of Accounting and Audit & International Relations Officer. In 2011-2012 had research fellowship in Faculty of Economics of University of L'Aquila (Italy) on Environmental Accounting issues. He is a former DAAD scholarship holder, in 2007-2008 he was an exchange PhD student in Farm Management Group of Martin-Luther University in Halle (Germany). Author of more than 20 scientific papers and other publications.
8	Mansur Mashrabov	Assistant-Professor of Agrochemistry, Soil Science and Plant Protection of the Plants Department. His PhD research theme of “Scientific and theoretical basis of phosphoric feeding of the cotton plant in condition of meadow soil”. He published several articles and participated in some scientific conferences.
9	Abror Sadinov	Assistant-Professor of Agrochemistry, Soil Science and Plant Protection of the Plants Department. His PhD work is the theme of “Scientific bases of a nitric mode gypsum soils and influence of fertilizers on a cotton food”. He published some articles, on a research theme, and participated at several scientific conferences.
10	Toshniyoz Goziev	Dr. of Department of Soil Science, Agrochemistry, Soil Science and Plant Protection of SAI. Currently he is teaching for subjects Soil Science and Plant Protection at this Department. At fulfilling PhD dissertation He studied the questions of accumulation of water in the soil and its loss in the soil at mulchation of the soil with polyethylene film. Author of 25 scientific papers and other publications.
11	Pirnazar Bobomurodov	Dr. of Agriculture and Melioration Department SAI. His scientific are is “Irrigation crops and application of water system”. He have got participated some practical seminars for water system

		Uzbekistan. Author of more than 30 scientific papers and other publications.
12	Ismoil Ergashev	Professor, Dr. of Agricultural Machinery, User and Repair Department SAI. Have a good experience in educational area and participated different projects. Author of more than 100 articles and other publications.
13	Khabib Razzoqov	Dr. of Using and Repairing of Agricultural Machinery Department SAI. Have a good experience in educational area and participated different projects. Author of more than 50 articles and other publications.
14	Khofiz Pardaev	Assistant-Professor of Using and Repairing of Agricultural Machinery Department SAI. His scientific area is technology and sustainable development.
15	Zulayho Kazakova	Assistant-Professor of Agricultural Economics and Management Department SAI. Same themes of hers special sciences are is sustainable development sciences of environment and management of the water resources.
16	Maryam Nazarova	Senior teacher of Agriculture Economy and Management department SAI. Her researching area about the environmental problems, sustainable developing sciences of environment and management of the water resources. Author of more than 20 articles.

### 2.3 Facilities available / facilities purchased from TEMPUS grant

Material resources and services laboratories, classrooms, where appropriate special equipment, libraries, telecommunication networks, etc.

Hydrology Study Unit. The unit designed in order to carry out some simulations and measurements on the phenomena concerning rainfall catchment and drainages from water beds by means of pumping.

It enables to examine, experimentally, what happens in the real situations in which the permeable or impermeable ground of a hydrologic basin is subject to of various intensity and duration giving conditions of absorption, bunching and superficial runoff given by saturation.

### 2.4 Students

Evaluation data: number of students in the Master Study Programme and/or number of students in the courses (per course, per semester, per academic year).

---

**Courses for implementation in SAI:**

1. UZA3. Fundamentals of Ecology – Bs, Ms
  2. UZA5. Environmental Technology -Ms
  3. UZB4a. Ecological and Environmental Economics - Bc
  4. UZB4b. Green Economy - Bc
  5. UZC3c: Agricultural Water Management - Ms
  6. UZC3d: Irrigation Methods and Strategies - Ms
  7. UZD: Research Methodology and Theory of Science – Ms, Bc
- ▶ UZA3. Fundamentals of Ecology, 2.06-Ecology and environmental protection:
    - Included to curriculum of 15 Bs programs
    - 120 study hours equivalent to 4 ECTS.
    - total number of students 1325 (all 2<sup>nd</sup> year students)
  - ▶ UZA5. Environmental Technology -Ms5A620101-Soil sciences
    - 72 study hours equivalent to 3 ECTS.
    - Number of students 6
  - ▶ 5A620102 - Agrochemistry
    - 72 study hours equivalent to 3 ECTS.
    - Number of students 6
  - ▶ 5A630101 – Agricultural engineering
    - 72 study hours equivalent to ECTS.
  - ▶ Number of students 6UZB4a. Ecological and Environmental Economics - Bc5240100 - Farm management
    - 120 study hours equivalent to 4 ECTS.
    - Number of students 200
  - ▶ UZB4b. Green Economy - Bc5230100 - Agricultural economics
    - 94 study hours equivalent to 3 ECTS.
    - Number of students 81
    - Providing in Uzbek and Russian
    - From 2015 planned to provide in English
  - ▶ UZC3c: Agricultural Water Management5A620101 - Soil sciences
    - 114 study hours equivalent to ECTS.



- Number of students 6
- ▶ 5A620102 - Agrochemistry
  - 114 study hours equivalent to ECTS.
  - Number of students 6
- ▶ 5A630101 – Agricultural engineering
  - 84 study hours equivalent to ECTS.
  - Number of student 6
- ▶ UZC3d: Irrigation Methods and Strategies 5A620202 - Plant growing
  - 72 study hours equaling to equivalent to 3 ECTS.
  - Number of students 6
- ▶ UZD: Research Methodology and Theory of Science Provided at 1<sup>st</sup> semester of all master programs (21 program)
- ▶ 124 total hours equivalent to 4 ECTS
- ▶ Number of students = 61

<b>Courses</b>	<b>Study hours</b>	<b>ECTS</b>	<b>Number of students</b>
UZA3. Fundamentals of Ecology	120	4	1325
UZA5. Environmental Technology	72	3	18
UZB4a. Ecological and Environmental Economics	120	4	200
UZB4b. Green Economy	94	3	81
UZC3c: Agricultural Water Management	114	4	18
UZC3d: Irrigation Methods and Strategies	72	3	6
UZD: Research Methodology and Theory of Science	124	4	61
<b>Total</b>			<b>1709</b>

## 2.5 Survey of Students' opinion

The students' survey was directed to Bachelor and Master students of their final study year of the related fields and held in December, 2015. The survey has been answered by 75 students whereof 59 answered questionnaires were complete and usable for the analysis.

Detailed results of the survey are given below. The students answered mainly positive about their existing study programme with the majority of respondents choosing the respective value parameter of much/very much (on a scale ranging from 1=not at all to 5=very much or very true). However, the middle value parameter of 3 has been chosen by a significant amount of students summing up between 15 – 35% depending on the question. This reflects room for improvement of study content and teaching forms.

**Selected survey results:**

<i>Assessment of study programme and competences obtained</i>	<i>1 not at all; not applicable</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5 very much; very true</i>
Lecturers of my study programme are of high didactical expertise (n=59=100%)	0%	8%	23%	41%	15%
Supervision and guidance by lecturers was very good during my study period (n=159=100%)	1%	5%	21%	43%	18%
I have/had problems in following the subject matter during the courses (n=59=100%)	5%	13%	32%	26%	11%
I can/could choose from a multitude of course offers (n=59=100%)	13%	6%	25%	26%	17%
Technical equipment (presentation equipment, computer, copy machines, internet etc) is very good (n=59=100%)	3%	7%	23%	39%	16%
Subject-specific methodological knowledge was promoted during the study (n=43=100%)	1%	5%	35%	28%	13%
Ability to transfer knowledge (e.g. to apply existing knowledge to new problems) (n=43=100%)	1%	9%	25%	35%	13%
Environmental and sustainability studies (n=43=100%)	3%	10%	26%	32%	11%
Environmental economics(n=43=100%)	13%	10%	25%	24%	12%
Looking back, would you choose the same study programme / specialization again? (n=39=100%)	14%	9%	15%	25%	17%
	yes	no			
During the study programme I was able to work with practical / hands-on examples (n=75=100%)	59%	28%			



## 2.6 Opinions for improvement of Environmental Education (named by respondents)

- Greater freedom in organising courses of studies,
- More interactive teaching methods (case studies, discussions, etc.),
- Adjustment of the requirements for the examinations,
- Promotion of language skills in English,
- Improvement of technical equipment,
- More practical applications or contacts to future employers.










# COOPERATION HAMKORLIK

## AGRICULTURE H117D - Hydrology Study Unit - Code



**1. General**

The unit has been designed in order to carry out some simulations and measurements on the phenomena concerning rainfall catchment and storage from water tools by means of pumping it to various experiments, which happens in the field. It is a unit in which the permeable ground of a hydrology basin is subject to various velocity and duration of precipitation of absorption, infiltration and surface runoff from the surface.

For which is concerned in the aspects of the various phenomena of the water in the soil, a slope and feeding during pumping in general and also the interaction of water depression cones.

**2. Measurements**

The area on which the rain falls is simulated by a permeable soil layer of suitable dimensions, which, for the different exercises, can be filled up with sand, fine gravel and stone. Rainfall is simulated by the use of a spray nozzle supported by a metallic frame and fed by a motor pump. A simple control device controlled by an electric board and some external valves enables to simulate rainfall on the whole surface or only on a half of the ground under study while a (pressure) flow meter enables to keep under control either the time flow rate or the quantity of water.

**3. Possible experiments**

**3.1. Simulations of rainfall catchment, long duration and short duration, etc. measure of storage and rain volumes.**

**3.2. Measurements concerning the saturation time determination.**

**3.3. Rainfall on saturated area.**

**3.4. Rainfall on permeable ground.**

**3.5. Measurements on successive precipitations.**

**3.6. Analysis of slope influence on previous infiltration.**

**3.7. Measurements of the combined effects of surface runoff and sub-surface flows.**

**4. Mainly rainfall**

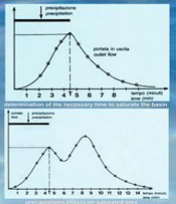
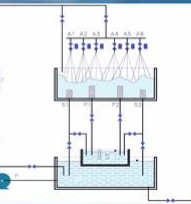

It is possible to simulate rainfall on a permeable soil layer of suitable dimensions, which, for the different exercises, can be filled up with sand, fine gravel and stone. Rainfall is simulated by the use of a spray nozzle supported by a metallic frame and fed by a motor pump. A simple control device controlled by an electric board and some external valves enables to simulate rainfall on the whole surface or only on a half of the ground under study while a (pressure) flow meter enables to keep under control either the time flow rate or the quantity of water.

**5. Results**

It is possible to simulate rainfall on a permeable soil layer of suitable dimensions, which, for the different exercises, can be filled up with sand, fine gravel and stone. Rainfall is simulated by the use of a spray nozzle supported by a metallic frame and fed by a motor pump. A simple control device controlled by an electric board and some external valves enables to simulate rainfall on the whole surface or only on a half of the ground under study while a (pressure) flow meter enables to keep under control either the time flow rate or the quantity of water.

**6. Test of infiltration**

It is possible to simulate rainfall on a permeable soil layer of suitable dimensions, which, for the different exercises, can be filled up with sand, fine gravel and stone. Rainfall is simulated by the use of a spray nozzle supported by a metallic frame and fed by a motor pump. A simple control device controlled by an electric board and some external valves enables to simulate rainfall on the whole surface or only on a half of the ground under study while a (pressure) flow meter enables to keep under control either the time flow rate or the quantity of water.





### 3. Samarkand State University (SSU)

#### 3.1 Facilities purchased from UZWATER TEMPUS grant

Within the bounds of project UZWATER at SSU the educational centre on studying of renewed energy sources has been created by order Rector and with assistance of Uzbek Bureau Commission EU compact and mobile installation LMER (Renewable Energy Laboratory) companies DIDAKTA from Italy which structure includes the device on studying of renewed energy sources has been got.

#### Equipments from project

List of equipments:

1. Laboratory equipment on renewable energy sources
2. 8 computers
3. 1 notebook
4. 1 video projector and screen
5. 4 in 1 (Copy machine, scanner, printer and fax).

#### Content of lab equipment

1. lab for study principia of Solar energy sources:
  - Polycrystalline Solar panels
  - Monocrystalline Solar panels

Measurement: short-circuit current, open-circuit voltage, filling factor, efficiency both: Polycrystalline and Monocrystalline Solar panels

2. Lab for study principia of Wind energy sources
3. Lab for study principia of fossil fuel

#### ECOLOGY – ENVIRONMENT LMER - Renewable Energy Laboratory



Compact mobile laboratory designed to introduce the students to the main renewable energy sources and their practical utilization. Furthermore, the Mobile Renewable Energy Laboratory easily allows both the students and the teachers to understand the principles and apparatus of innovative techniques for electricity and hydrogen production.

The unit is composed of:

- a) Solar Energy Training System
- b) Wind Energy Training System
- c) Fuel cell regular type, Microbial (MFC) and hydrogen production training system
- d) Tools
- e) Supports

Each component can be acquired separately or together fitted in a trolley.

Installation laboratory equipment on renewable energy sources (Didactica from Italy)







### Equipment from project in education process

The laboratory equipment currently used in education process for masters on direction “Heliophysics and using of the solar energy”, “Hydrometeorology” (Lakes and water-storage basins) and for bachelors on “Electronics and Microelectronics”, “Hydrometeorology”, “Hydrology (Land Hydrology)” Samarkand State University. Besides laboratory equipment is used for four times in a year for teaching Alternative energy sources course, for students improvement of professional skill of faculty Improvement of professional skill and retraining of scientifically pedagogical specialists at the Samarkand state university. Volume of hours 44, number of students 120.





### 3.2 Courses for implementation in SASU:

- a. UZB2. Energy and climate - Bs, Ms
- b. UZA3. Fundamentals of Ecology – Bs, Ms
- c. UZB4b. Green Economy - Bc
- d. UZD: Research Methodology and Theory of Science – Ms, Bc

► UZA3. Energy and climate - Bs, Ms:

- Included to curriculum of 5 Bs and 2 Ms programs
- 120 study hours equivalent to 4 ECTS.
- total number of students 250
- From 2015 planned to provide in English

► UZA3. Fundamentals of Ecology:

- Included to curriculum of 35 Bs programs
- 120 study hours equivalent to 4 ECTS.
- total number of students 1800

► UZB4b. Green Economy – Bc, Ms

- 94 study hours equivalent to 3 ECTS.
- Number of students 225
- Providing in Uzbek and Russian

► UZD: Research Methodology and Theory of Science Provided at 1<sup>st</sup> semester of all master programs (44 program)



- ▶ 124 total hours equivalent to 4 ECTS
- ▶ Number of students = 226

Courses	Study hours	ECTS	Number of students
UZH2. Energy and climate - Bs, Ms	120	4	250
UZA3. Fundamentals of Ecology	120	4	1800
UZH4b. Green Economy	94	3	225
UZH: Research Methodology and Theory of Science	124	4	226
<b>Total</b>			<b>2501</b>





Tempus

UZWATER



## **4. Samarkand State Architectural and Civil Engineering Institute (SSACEI)**

### **4.1 Centre for Sustainable Water Resource Management**

Centre was established at SSACEI on September 2014. The Centre is equipped by DIDACTA (Italy) water conditioning plant and organized a small library with books provided by UZWATER EU partners during our visits and to EU training courses and EU partners visit to Samarkand. The centre has two rooms: one is for conducting classes for the master students which is facilitated by internet and PC, projector, screen and other necessary equipment. The second room is for lab equipment and UZWATER documentations. The Centre is used for the classes and research work of master students.

### **4.2 Courses**

SSACEI developed curriculum for Master program in environmental science and sustainable development with focus on water management. The Water Supply, Wastewater and Water Resource Protection Department has expertise in water and wastewater subjects. SSACEI has experience of partnership in many international projects. Different departments of the SSACEI were part of the projects funded by Tempus, JICA, UNESCO, Fulbright, CRDF and others. Staff has experience in research, education and practical applied expertise.

SSACEI offers following courses "Basics of sustainable development in water resources" for undergraduate students and "Sustainable water resources management" course for master degree students. These courses are part of the UZWATER Program and in the near future is planned to have master students in "Water Resources Sustainable Water Resources". All UZWATER SSACEI team members are involved in these courses and to apply for the Sustainable Water Resources Management" Program at SSACEI.

## **5. National University of Uzbekistan (NUUz)**

### **5.1 Activities at Study Centre**

National Training Center of Education for Sustainable Development was established at the National University of Uzbekistan and equipped by computers, printers, laptops and video-projector within UZWATER project in April, 2014. Study room (class) was allocated at NUUz for the Center (at Faculty of Physics, room №126).





Recently, NTC on ESD are being used for some relevant workshops, trainings and other events. Members of UZWATER team from NUUz work in the Center as volunteers and conduct some meetings, lectures and lessons. NTC is also used for teaching of the university Master and Bachelor students (from faculty of geology and geography).



So, workshop “Modern methods for assessment of water quality” was held in October, 21, 2015. Professionals from NUUz (the National University of Uzbekistan), NIGMI (Research

Hydrometeorological Institute), Tashkent Research Institute “VODGEO”, Tashkent Waste water treatment plant (Salar station) and representative of LAR Process Analysers AG company (Germany) took part in the workshop

The workshop was held with join Germany-Uzbekistan project “Projekt E6064 – LAR - Wasserüberwachung – Usbekistan“ – Demonstration of measurement system for simplification of monitoring system for surface water quality with account taken of using for drinking water supply and use for agriculture.



Dr. Azamat Azizov reported about goal, objectives and outcomes of the project. Dr. Olga Smolkova (senior engineer of LAR Process Analysers AG company, Germany) spoke with presentation “Innovative technologies for water quality assessment”. She presented up-to-day devices of LAR-company for automatic and manual monitoring of water quality. Dr. Lyubov Shapovalova reported about her team activities in the join PPP-project and talked about researches dedicated to study of petrochemical products destruction in soils.

The workshop participants visited Department of Applied ecology and sustainable development at NUUz, they were shown operation of the equipment of LAR Process Analyser AG-company that was obtained by the department in the PPP-project. Professionals were interested to see automatic systems for water toxicity assessment (NitriTox) and measurement of pH, EC, Redox-potential and ammonia-ions in water (Ammonitor); besides, Quick-COD measurement system was demonstrated.



On the 5<sup>th</sup> of November, 2015 a training seminar for teachers was held at the National University of Uzbekistan at the NTC for Education for Sustainable Development, The seminar was attended by 15 people - school and college teachers in Tashkent.

During the seminar there were presented teaching materials for a lesson about water resources; why and how to save water (in Uzbek and Russian languages) and information required for registration and participation in the project "Waterkeepers".

A. Azizov told about the project International Environmental lesson "WaterKeepers", that involves teachers from 7 countries - Russia, Azerbaijan, Belarus, Kazakhstan, Uzbekistan, Kyrgyzstan and Tajikistan. The purpose of the project is to form responsible attitude of the young people to water resources of the planet and their countries, as well as teach them to save water in their daily lives.

We invited teachers to join the project, conduct eco-lessons at their schools and together with their pupils to become the guardians of the water of our region!

Natalia Akinshina held a demonstration lesson on "Waterkeepers".







The teachers listened with interest to the mini-presentation and participated in group work, performed some creative tasks.

At the end of the training seminar Rosa Musina made a methodological analysis of the lesson and told about the methods that one can use for this tutorial. She also suggested a questionnaire for the teachers and summed up the seminar.

The participants promised to carry out similar lessons at their schools and colleges within the period from 10 to 17 November, as well as in other countries.

TV-program on local channel “Tashkent” was devoted to that event. Short movies about our lesson “Waterkeepers” in Russian and Uzbek were demonstrated during a week.



On the **9<sup>th</sup> of November**, 2015 at the Center for ESD at National University of Uzbekistan Khilola Nikadambaeva held a seminar for students of the Faculty of Geology and Geography. During the seminar, the students (future geography teachers at schools and colleges) participated actively in the discussion on issues of water conservation, preparing different creative tasks. An educational film 'Water is a life', dedicated to the water problems of Uzbekistan and the problem of trans boundary water resources, was shown during the seminar.





Besides, Azamat Azizov, Rusania Musina and Natalya Akinshina held trainings/workshops related to issues of UZWATER project in other institutions

- Integration of Climate change issues into educational system (28 March, 2014, Tashkent), UNDP;

- Climate change and climate risk management (for specialists of Uzhydromet, 28 May, 2014; for lecturers of High educational institutions, 01 July, 2014; for mass-media specialists, 29 October, 2014), Tashkent, UNDP;
- SD-concept and sustainable natural resources management (for decision-makers and authorities, 9-10 October, 2014), Nukus, UNESCO.



## 5.2 UZWATER courses

NUUz offers following study courses:

Faculty of Geology and Geography

- Water resources of Uzbekistan (Bachelor),
- Integrated water resources management (Master level),
- Climate change and climate risk management (Bachelor level),
- Geography of Uzbekistan (Master level).

Faculty of Biology and soil science

- Fundamentals of ecology (Bachelor level),
- Environmental protection and sustainable development (Master level),

- Environmental legislation (Master level),
- Environmental biotechnologies (Master level).

Faculty of Physics

- Renewable energy (Bachelor level).

## **6. Tashkent Technical University (TTU)**

### **Training Centre**

The Centre worked out the action plan for the targeting to widen the scope of scientific researches, sophistication of preparing the highly qualified scientific and scientific-pedagogic personnel, and on the systematic base attract students into the conducted scientific and research work. The staff at the center has considerable research, education and practical experience. The training centre attend in developing of teaching curricula, organization of training courses, fieldwork and workshops. Staff members involved into the centre activities will consult their colleagues from other universities; they supervise MSc and PhD theses. There is also long-term experience of cooperation with EU universities and universities in Central Asia. The centre developed a field based teaching for water desalination. Staff members are also involved into the development, testing and marketing of equipment to use solar energy for water supply and water treatment.

## **7. Urgench State University (UrSU)**

### **7.1 Programme Summary**

Urgench State University deeply involved in all project activities since the first days of the project beginning. At the same time, the project team was composed according to the university rector order.

The majority of the project team has basic knowledge and skills of international educational collaboration with EU partner universities in the framework of TEMPUS and ERASMUS projects, the specific features of EU countries educational systems, conceptual approaches to the ecological education and sustainable development courses content. The university team members have been involved in development of environmental science study programs for many years. For example, all Bachelor programs offered by the UrSU include basic course of Fundamentals of Ecology and all Master courses contains course on Research Methodology and Theory of Science.



The university team members participated in cooperation with other project partners on development new Master program modules. These subjects were introduced at UrSU at the pilot 2014-2015 academic year. The updated curricula is approved by scientific council of UrSU.

Also, EU partners provided two 1-week trainings at UrSU to develop necessary skills and knowledge of professors, teachers and perspective Master students on starting new program. EU partners at UrSU conducted intensive training and seminars in November, 2014 and April, 2015.

During 2013-2015, 6 faculty members visited EU partner universities for 1-2 weeks. Curricula and syllabi of core courses of Master Programme finished. Descriptions of all courses are ready. Study centre established as co-financing and fully equipped from Tempus, literature is collected. The university team also translated two textbooks from English to Uzbek and Russian: Sustainable Use and Management of Natural Resources (from English to Uzbek) and Energy and Climate (from English to Russian)

At 2014-2015 academic year, modules of Fundamentals of Ecology, Environmental Technology, Ecological and Environmental Economics, Research Methodology and Theory of Science with updated syllabi launched to teach at pilot stage for in total 1520 students.

## **7.2 Academic staff available for realisation of the Study programme/courses**

Academic staff for realisation of the new Master program will be invited from 3 departments of the Faculty of Natural Sciences and also from NGO KRASS: Department of Soil Sciences, Department of Biology, Department of Chemistry.

- Percentage of teachers who are ‘Doctors’, 38% ;
- Academic categories of the faculty available: assistant teacher, teacher, senior teacher, docent, professor;
- Total number of full-time academic staff is 43.
- Total number of part-time academic staff is 5

### **List of academic staff and their competences for implementation of study courses in UrSU.**

<b>№</b>	<b>Full name</b>	<b>Position, knowledge and experience within the topic of the project</b>
1	Sardor Khodjaniyazov (Coordinator)	Deputy Rector on Academic Issues & Dr. of Theory and History of Pedagogics. Have a big experience in higher education administration and organization of international collaboration areas. Responsible for development and implementation of new study programs and improvement of existing courses. Author of more than 60 scientific papers and other publications.



2	Ikrom Abdullayev	Deputy Rector on Science and Research & Dr. of Biology. Have an essential experience in higher education administration area and participated different projects. Responsible for curriculum development and research activities. Author of more than 60 scientific papers and other publications.
3	Ravshan Atakhanov	Head of International Relations Department. Has been in different institutions in abroad and have big experience in this field. Responsible for international affairs at the university. Has a strong academic background in water resources management and use.
4	Lola Gandjaeva	PhD student of Urgench State University at the Department of "Soil science"- specialty is Agriculture Sciences. Has a reasonable experience in university administration and she was able to show all her skills and abilities in the academic quality assurance, educational activities, library works, common international relations, export of education and personnel policies. Now she is a member of the NGO KRASS (Khorezm Rural Advisory Support Service). Author of more than 40 scientific papers and other publications.
5	Inna Rudenko	Dr., Professor of Economics. Responsible for developing education materials; conducting training and seminars. Title of PhD thesis: "Value Chains for Rural and Regional Development: The Case of Cotton, Wheat, Fruit and Vegetable Value Chains in the Lower Reaches of the Amu Darya River, Uzbekistan". Now she is a senior researcher and economist of the NGO KRASS. She is responsible for targeted households survey and analyses; market price analyses; supervision of research teams, bachelor and master students at Urgench State University. Author of more than 55 scientific papers and other publications.
6	Oybek Egamberdiyev	Dr. of Soil Sciences and Docent at the Department of Soil Sciences. His PhD title of thesis: "Dynamics of irrigated alluvial meadow soil properties under the influence of resource saving and soil protective technologies in the Khorezm region". He has got participated some practical seminars for water system Uzbekistan. Author of more than 38 scientific papers and other publications and He is a member of the NGO KRASS.
7	Anvar Tadjiev	Dr. of Microbiology. Head of Soil Sciences Department. He is manager of some national projects. Responsible for developing education materials; conducting training and seminars. Author of more than 50 scientific papers and other publications.

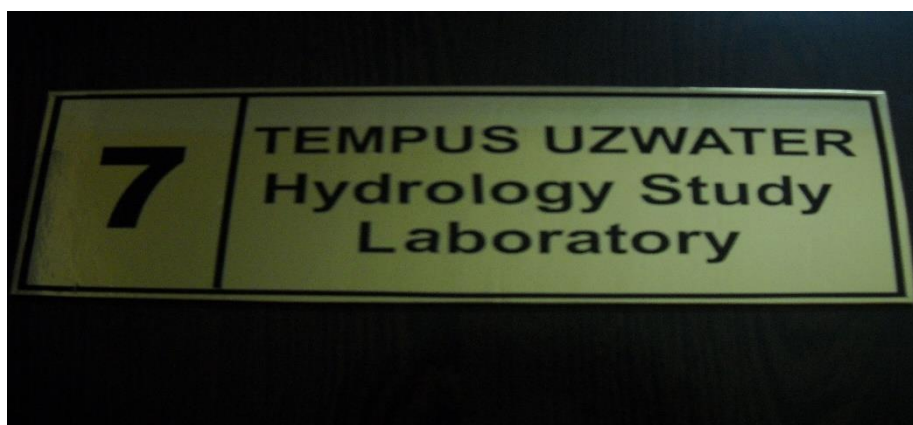
8	Jumanazar Ruzimov	Agronomist and Associate Professor of Soil Sciences Department. Responsible for developing education materials; conducting training and seminars. His PhD title of thesis: “Transformation of nitrogen in irrigated typical sierozems and utilization of it by cotton depending on different ratio of mineral and organic fertilizers nitrogen”. He participated short term expert on organizing and providing the field experiment for ICARDA to synthetic wheat 120 genotypes experiment in saline soil of Khorezm. Author of more than 65 scientific papers and other publications and He is a member of NGO KRASS.
9	Rasul Ruzmetov	Agronomist and teacher of Soil Sciences Department. Responsible for developing education materials; conducting training and seminars. He worked as a Chief Agromist at the national projects. Author of more than 30 scientific papers and other publications and
10	Dilyara Makhmudova	Agronomist and teacher of Soils Sciences Department. Responsible for developing education materials; conducting training and seminars. Has a good experience in educational area and participated different national projects. Author of more than 20 scientific papers and other publications and
11	Khudaybergan Palvanov	Dr. of Chemistry and Dean of Natural Sciences Faculty. He interacts professionally with faculty and partners outside the department. Has a reasonable experience in university administration. He managed some national projects. Author of more than 50 scientific papers, textbooks and other publications.
12	Yulduz Jumaniyazova	Agronomist and Senior Researcher in NGO KRASS . Responsible for field experiments, field days, training and seminars for NARS and farmers and develop crop modes. PhD title of thesis: “Efficiency of nitrogen fertilizer rates under various irrigation level in winter wheat”. She published several articles and participated in some scientific conferences. Author of more than 30 scientific papers and other publications.

### 7.3 Facilities available / facilities purchased from TEMPUS grant

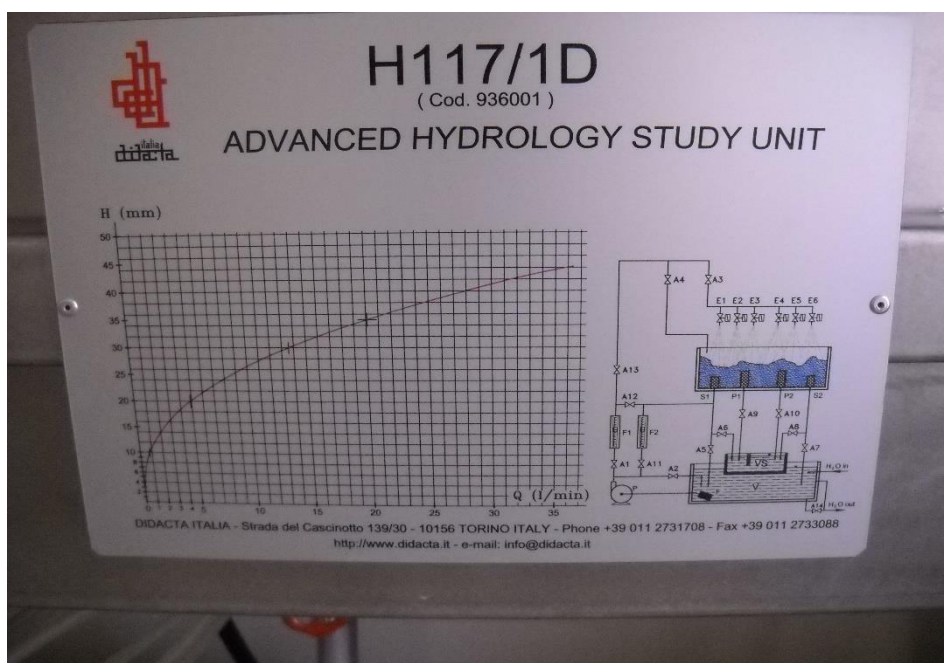
All required facilities are available in the UZWATER Study Center. The center situated on the first floor of the Natural Sciences and Geography Faculty building. There are 12 personal computers and notebooks, wireless Internet connections and other required facilities for all Master students. All necessary books, educational materials, multimedia tools are available for the students. The university administration highly appreciates the EU partner universities, especially Uppsala University

contributions to the center library, which now consists of more than 30 textbooks and teaching aids. Part of these textbooks is developed in the framework of the Baltic University Program and demonstrates unique experience of successful teaching of environmental sciences.

The center also includes UZWATER laboratory for water studies. The representatives of DIDACTA ITALIA Company installed special laboratory equipment ADVANSED HYDROLOGY STUDY UNIT H117/1 D on August 7, 2014. They also provided 1-day training for local teachers and UZWATER team members for the purposes of successful using this equipment. The laboratory allows arranging analysis of ground waters by 20 parameters and plays the important role in strengthening of cooperation with stakeholders as well.







## 7.4 Students

Evaluation data: number of students in the Master Study Programme and/or number of students in the courses (per course, per semester, per academic year).

### Courses for implementation in SAI:

8. UZA3. Fundamentals of Ecology – Bs
  9. UZA5. Environmental Technology -Ms
  10. UZB4a. Ecological and Environmental Economics - Bs
  11. UZD: Research Methodology and Theory of Science – Ms
- ▶ UZA3. Fundamentals of Ecology, 2.06-Ecology and environmental protection:
    - Included to curriculum of 44 Bs programs
    - 120 study hours equivalent to 4 ECTS.
    - total number of students 1500 (all 2<sup>nd</sup> year students)
  - ▶ UZA5. Environmental Technology –Bachelor Program on Soil Sciences
    - 72 study hours equivalent to 3 ECTS.



- Number of students is 25
- ▶ UZB4a. Ecological and Environmental Economics – Bachelor Program in Economics
  - 120 study hourse equivalent to 4 ECTS.
  - Number of students is 25
- ▶ UZD: Research Methodology and Theory of Science
 

Provided at 1<sup>st</sup> semester of all master programs (12program)

124 total hours equivalent to 4 ECTS

Number of students is 59

<b>Courses</b>	<b>Study hours</b>	<b>ECTS</b>	<b>Number of students</b>
UZA3. Fundamentals of Ecology	120	4	1500
UZA5. Environmental Technology	72	3	25
UZB4a. Ecological and Environmental Economics	120	4	25
UZD: Research Methodology and Theory of Science	124	4	59
<b>Total</b>			<b>1609</b>

### 7.5 Internal evaluation of the Master program

The university Council experts carefully viewed and evaluated the content of all courses, including curricula, course descriptions and textbooks. Then this issue was discussed and approved by University Council as a pilot courses beginning with 2014-2015 academic year.

## **8. Bukhara State University (BSU)**

### **8.1 Programme Summary**

The BSU involved in all project activities since institution is a member of the thematic group The project team was established from first year of activities. Members of project team trained for history, environment and culture of EU partners, educational system, ECTS, development of curriculum aligned with Bologna process, comparison with educational system in Uzbekistan, concepts of development of environmental science study programs, Fundamentals of Ecology, Environmental Technology, Ecological and Environmental Economics, Green Economy Agricultural Water Management, Research Methodology and Theory of Science. These modules were updated on shared responsibility principle with other partners of project. This subjects were introduced at BSU at the pilot 2014-2015 academic year. Also, EU partners provided 1 week training at BSU to eliminate missing skills and knowledge of faculty on teaching new program.

The updated curricula is approved by scientific council of BSU. Harmonized curricula consists only part of whole curricula, covering specialized and professional subjects, while general subjects remaining the same, as they are obligatory.

During 2013, 4 faculty members visited EU partner universities for 1 week. Curricula and syllabi of core courses of Master Programme finished. Teams were formed for all core courses. Description of courses are ready. Compendia for courses The Uzbekistan Waterscape in English and Russian is finished. Study centre established as co-financing and equipped from Tempus, literature is collected.

At 2013-2015 academic year, modules of Hydro ecology, Fundamentals of Ecology, Scientific-fundamental basis of Ecology, GIS Technology in environmental and ecological security, Sanitary condition of water pools, Use and water resources management in Uzbekistan, The conception of sustainable development are updated syllabi launched to teach at pilot stage for in total 1240 students. Group of authors finished development of textbook "The Uzbekistan Waterscape".

### **8.2 Academic staff available for realisation of the Study programme/courses**

Academic staff:

- Percentage of teachers with scientific degrees: 75 % ;
- Academic categories of the faculty available: assistant teacher, teacher, senior teacher, docent, professor;

- Total number of full-time academic staff and percentage of dedication to the degree: 8 academic staff, 75 % have scientific degrees.
- Total number of part-time academic staff and hours/weeks of dedication to the degree: 8 full time staff, working 770 academic hours per year.

List of academic staff and their competences for implementation of study courses in BSU

<b>№</b>	<b>Full name</b>	<b>Position, knowledge and experience within the topic of the project</b>
1	Mukhtor Turaev (Coordinator)	Docent of Ecology Chair. PhD in Biology. His scientific field is related with ecological problems and ornithology in water areas. He is the constant participant of many national and international projects.
2	Durdimurod Durdiyev (consultant)	Vice-rector on Educational Affairs. Professor of Mathematics Chair, Doctor of Physical-Mathematical Sciences.
3	Abror Juraev	International project manager, PhD in Economics. Scientific interests include international economics, green economics, sustainable development.
4	Olim Rahimov	Vice-rector on Economic and Financial Affairs. His scientific field is related with sustainable water usage.
5	Muzaffar Sharipov	Docent of Chemistry Chair. His scientific field is in chemistry of polymers, as well as creating composite materials for textile industry. He is working in research projects on filtering wastewater from industry.
6	Khudoynazar Toshov	Secretary of Scientific Council of BSU. Docent of Geography and Soil Sciences Chair, PhD in Geography. Scientific interests include landscape and hydrogeology of regional and river basin regions, as well as theoretical bases of teaching geography.
7	Ahmad Mavlonov	Docent of Geography and Soil Sciences Chair, PhD in Geography. Scientific interests include land usage and geographical changes in building new cities and buildings in Bukhara and neighboring regions.
8	Yokub Kholov	Senior Lecturer of Ecology Chair. Participant of a number of Tempus projects. Scientific interests are related with agricultural and ecological problems of newly developed lands in Bukhara Region, as well as newly irrigated lands in North-western regions of Uzbekistan.

---

### 8.3 Facilities available / facilities purchased from TEMPUS grant

Material resources and services laboratories, classrooms, where appropriate special equipment, libraries, telecommunication networks, etc.

Renewable Energy Laboratory, purchased within UZWATER project. The unit designed in order to carry out some simulations and measurements on the phenomena concerning rainfall catchment and drainages from water beds by means of pumping. It enables to examine, experimentally, what happens in the real situations in which the permeable or impermeable ground of a hydrologic basin is subject to of various intensity and duration giving conditions of absorption, bunching and superficial runoff given by saturation.

### 8.4 Students

Evaluation data: number of students in the Bachelor study program in the courses (per course, per semester, per academic year).

#### Courses for implementation in BSU:

12. UZA2a. Fundamentals of Ecology – Bc (ALL edu.dir)
  13. UZA2b: General hydrobiology - Ms (Ixtiology and hydrobiology speciality)
  14. UZA3a: Hydroecology - Bc
  15. UZB3a. Scientific-fundamental basis of Ecology, - Bc
  16. UZB3b GIS Technology in environmental and ecological security Bc
  17. UZC3d: Conception of sustainable development
  18. UZC3d: Land improvement and cultivation the destroyed earths -Bc
  19. UZD4a: Sanitary condition of water pools
  20. UZD4b: Research Methodology and Theory of Science– Bc
  21. UZD5a: Use and water resources management in Uzbekistan – Bc
- ▶ UZA2a. Fundamentals of Ecology, 2.05-Ecology:
    - Included to curriculum of 26 Bs programs
    - 120 study house equivalent to 4 ECTS.
    - total number of students 1560 (all 2<sup>nd</sup> year students)
  - ▶ UZA2b. 2.01-General hydrobiology. Ms5A140103- Ixtiology and hydrobiology
    - 126 study hours equivalent to 4 ECTS.
    - Number of students 7

- ▶ Number of students 6UZB4a. Research Methodology and Theory of Science – 5630100-Ecology and environmental security
  - 146 study hourse quivalent to 5 ECTS.
  - Number of students 67
- ▶ UZB4b. Sanitary condition of water pools – 5630100-Ecology and environmental security
  - 94 study hourse quivalent to 3 ECTS.
  - Number of students 67
  - Providing in Uzbek and Russian
  - From 2016 planned to provide in English
- ▶ 3.08-Hydroecology
  - 154 study hourse quivalent to 5 ECTS.
  - Number of students 67
- ▶ 3.03.-Scientific-fundamental basis of Ecology
  - 194 study hoursequivalent to 6 ECTS.
  - Number of students 67
- ▶ 3.12-GIS Technology in environmental and ecological security
  - 182 study hoursequivalent to 6 ECTS.
  - Number of student 67
- ▶ UZC3B: 3.14-Conception of sustainable development
  - 134 study hours equaling to equivalent to 4 ECTS.
  - Number of students 67
- ▶ UZD5: Use and water resources management in Uzbekistan provided at 1<sup>st</sup> semester of 5630100-Ecology bachelor programs
- ▶ 88 total hours equivalent to 3 ECTS
- ▶ Number of students = 67

<b>Courses</b>	<b>Study hours</b>	<b>ECTS</b>	<b>Number of students</b>
UZA2a. Ecology	120	4	1560
UZA2b. General hydrobiology	126	4	7

UZB4a. Research Methodology and Theory of Science	146	5	67
UZB4b. Sanitary condition of water pools	94	3	67
UZC3a: Hydroecology	154	5	67
UZC3b: Scientific-fundamental basis of Ecology	194	6	67
UZC3c: GIS Technology in environmental and ecological security	182	6	67
UZC3d: Conception of sustainable development	134	4	67
UZD5: Use and water resources management in Uzbekistan	88	3	67
<b>Total</b>			<b>2036</b>







Mukhtor Turaev is teaching a lecture on Renewable Energy Sources to the participants of 2-month retraining course in Chemistry, Biology, Ecology fields, using the UZWATER project laboratory, in January-February 2016.

### Survey of Students' opinion

Students survey was conducted in January 2016. Survey was held within Bachelor and Master students. The survey has been answered by 80 students.

Below follows the results. Replies were mainly positive.

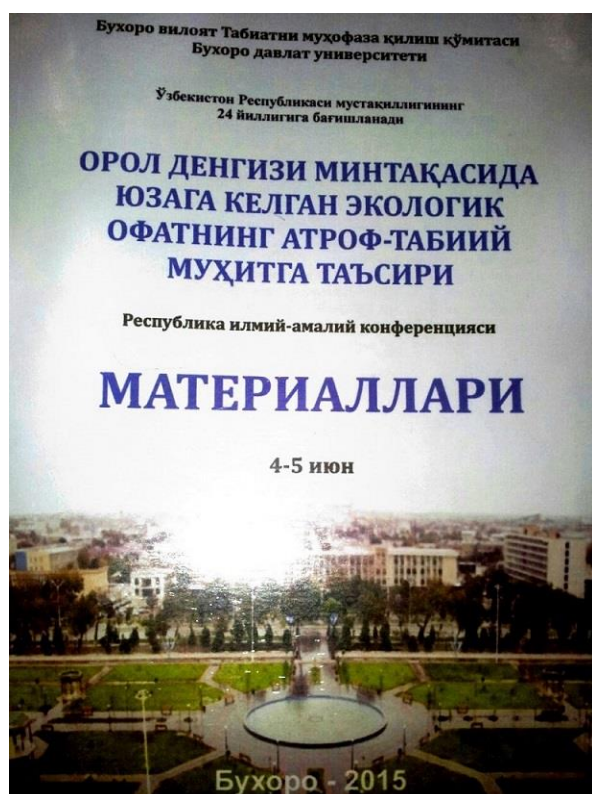
### Selected survey results:

<i>Assessment of study programme and competences obtained</i>	<i>1 not at all; not applicable, %</i>	<i>2 %</i>	<i>3 %</i>	<i>4 %</i>	<i>5 very much; very true, %</i>
Lecturers of my study programme are of high didactical expertise (n=80=100%)	2,4	9,6	12	22,4	17,6
Supervision and guidance by lecturers was very good during my study period (n=80=100%)	1,6	10,4	12,8	21,6	17,6
I have/had problems in following the subject matter during the courses (n=80=100%)	3,2	8	14,4	19,2	19,2
I can/could choose from a multitude of course offers (n=80=100%)	1,6	6,4	10,4	24,8	20,8
Technical equipment (presentation equipment, computer, copy machines, internet etc) is very good (n=80=100%)	0,8	7,2	9,6	19,2	27,2
Subject-specific methodological knowledge was promoted during the study (n=80=100%)	1,6	9,6	11,2	22,4	19,2



Ability to transfer knowledge (e.g. to apply existing knowledge to new problems) (n=80=100%)	1,6	8,8	15,2	25,6	12,8
Environmental and sustainability studies (n=80=100%)	0,8	4,8	9,6	23,2	25,6
Environmental economics (n=80=100%)	1,6	11,2	10,4	24,8	16
Looking back, would you choose the same study programme / specialization again? (n=80=100%)	2,4	10,4	11,2	20	20
During the study programme I was able to work with practical / hands-on examples (n=80=100%)	2,4	9,6	12,8	20,8	18,4

A Republican conference “Effect of Ecologic Disease in the Aral Sea Region to the Environment” within UZWATER project was held on 4-5 June 2015 in BSU, with the cooperation of Bukhara Regional Department of Environmental Protection. More than 200 works were published in the proceedings of the conference, 4 panel sessions were organized.



Республикамизнинг барҳарор ривожланишида экологик омилларнинг муҳимлиги, уларнинг табиатдаги тутган ўрни, муҳофазаси, содир бўладиган экологик муаммоларнинг ўз вақтида ечимларининг топилиши муҳим аҳамиятга эга.

Ўзбекистон Республикаси мустақиллигининг 24 йиллигига бағишланган ўтказилаётган илмий-амалий анжуманда қуйидаги йўналишлар бўйича мақолалар тўплами келтирилган:

- иқлим ўзгариши, чўлланишга қарши кураш, сув ресурсларини бошқариш ва ундан оқилона фойдаланиш мезонлари;
- ўсимлик ва ҳайвонот олами биохилма-хиллигини авайлаб асраш, қўлайлаштириш омиллари;
- аҳоли саломатлигини муҳофаза қилишнинг ижтимоий-иқтисодий масалалари, янги техника, технология инновацион ҳояларни янги қилишнинг устивор йўналишлари;
- экологик таълим-тарбия ва тарғибот-ташвиқотнинг замонавий услубларини жорий қилишнинг афзалликлари.

Тўпламда соҳанинг етук олимлари каторида иқтидорли ёш олимларнинг ҳамда ушбу соҳага тегишли бўлган корхона ва ташкилотлар мутахассисларининг илмий-тадқиқот ишлари мужассамлаштирилган.

Тўпламда келтирилган маълумотлардан ўрта махсус ва олий таълим муассасалари талабалари, магистрлари, профессор-ўқитувчилари ҳақида экология соҳаси бўйича барча мутахассислар фойдаланиши мумкин.

Тўпламга киритилган мақолалар мазмуни, илмий салоҳияти ва далилларнинг ҳаққонийлиги учун муаллифлар масъулдирлар.

#### Таҳрир хайъати:

Артикова Х.Т. (масъул муҳаррир)  
Пардаев Ш.С., Тўраев М.М., Мавлонов А.М.

#### Тақризчилар:

Тулаганов А.А., БухДУ ректори, техника фанлари доктори, профессор  
Нижёзов А.Б., Бухоро вилояти табиатни муҳофаза қилиш қўмитаси раиси

Project team also participated at “Regional Forum on Youth Employment and Entrepreneurship”, organized at Bukhara State University, 10-11 March 2016, and presented their vision of employment and entrepreneurship skills development opportunities of students in the fields related with environmental studies.



## **9. Karakalpak State University (KKSU)**

### **9.1 Programme Summary**

The KKSU involved in all project activities since institution is responsible together with Uppsala University for thematic group of Building Sustainable Societies. The project team was established from first year of activities. Members of project team trained for history, environment and culture of EU partners, educational system, ECTS, development of curriculum aligned with Bologna process, comparison with educational system in Uzbekistan, concepts of development of environmental science study programs, Fundamentals of Ecology, Environmental Technology, Ecological and Environmental Economics, Waste Management, Spatial planning and Urban development, Research Methodology and Theory of Science. These modules were updated on shared responsibility principle with other partners of project. This subjects were introduced at KKSU at the pilot 2014-2015 academic year. Also, EU partners provided 1 week training at KKSU to eliminate missing skills and knowledge of faculty on teaching new program. The updated curricula is approved by scientific council of KKSU. Harmonized curricula consists only part of whole curricula, covering specialized and professional subjects, while general subjects remaining.

During 2013, 4 faculty members visited EU partner universities for 1 week. Curricula and syllabi of core courses of Master Programme finished. Teams were formed for all core courses. Description of courses are ready. Compendia for courses Green Economics and Sustainable development in English and Uzbek is finished. Study centre established as co-financing and equipped from Tempus, literature is collected. Head of project team at KKSU Dr.Eshniyazovgot continued training at EU partner universities. At 2014-2015 academic year, modules of Fundamentals of Ecology, Environmental Technology, , Research Methodology and Theory of Science with updated syllabi launched to teach at pilot stage for in total 1200 students. Group of authors finished development of textbook "Building Sustainable Societies".

### **9.2 Academic staff available for realisation of the Study programme/courses**

Academic staff:

- Percentage of teachers who are ‘Doctors’, 35% ;
- Academic categories of the faculty available. assistant teacher, teacher, senior teacher, docent, professor;

- In the case of public universities: number of Professors (CU), number of Holders University (TU or CEU, TEU) and contract (Contract Doctor, Associate Doctor and Assistant Doctor, Assistants, Associates, seats linked to clinical specialties, etc.), 5 years contract according to scientific boards decision, other case every year 1 year contract;
- Total number of full-time academic staff and percentage of dedication to the degree, 59/35%;
- Total number of part-time academic staff and hours/weeks of dedication to the degree 7 part time staff, 770 hours per year.

List of academic staff and their competences for implementation of study courses in SAI.

<b>№</b>	<b>Full name</b>	<b>Position, knowledge and experience within the topic of the project</b>
1	Rustam Eshniyazov (Coordinator)	Associate Professor of Architecture and City Planning Department of the KKSU. Alumni of Junior Faculty Development Program, ACCELS, USA
2	DaniyarJumamuratov (Head of work group in KKSU)	Head of the Engineer Communication Department of the KKSU Have a big experience in educational area and participated different projects. Responsible to education, curriculum development, works to monitoring board on educational processes at the Institute. Author of more than 30 scientific papers and other publications.
3	Shukhrat Abdullaev	Head of International department, Dr. of Philology in the Faculty of Philology. Has been in different Institutions in abroad and have big experience in this field. Responsible to International affairs at the Institute, senior researcher. Author of 30 scientific papers and other publications.
4	Tengel Sitmuratov	Associate Professor of Accounting Department of the KKSU. Author of more than 60 scientific papers and other publications.
5	Qanatbay Ismailov	Professor, Dr., Head of Semiconductor Physics Department of the KKSU. He has managed some national projects. Author of more than 150 scientific papers, textbooks and other publications.
6	Kengesbay Baymanov	Professor, Dr.,Engineer Communications Department of the KKSU. He has managed some national projects. Author of more than 150 scientific papers, textbooks and other publications.

7	Gulia Khodjaeva	Dr., Associate Professor in the department of Geography of the KKSU. She has participated on some national and international projects. Author of more than 50 scientific papers, textbooks and other publications.
8	Orinbay Nazarbaev	Associate Professor of Economics Department. He has managed some national projects. Author of more than 120 scientific papers, textbooks and other publications.
9	Arzigul Qidirbaeva	PhD Student, Ecology Department of the KKSU. She has published more 15 scientific articles, 3 of which abroad.
10	Rifkat Gimush	Associate Professor (part time) at Architecture and City Planning Department of the KKSU. He has managed some national projects. Author of more than 150 scientific papers, textbooks and other publications.

### 9.3 Facilities available / facilities purchased from TEMPUS grant

Material resources and services laboratories, classrooms, where appropriate special equipments, libraries, telecommunication networks, etc.

It enables to examine, experimentally, what happens in the real situations in which the permeable or impermeable ground of a hydrologic basin is subject to of various intensity and duration giving conditions of absorption, bunching and superficial runoff given by saturation.

### 9.4 Students

Evaluation data: number of students in the Master Study Programme and/or number of students in the courses (per course, per semester, per academic year).

#### Courses for implementation in SAI:

22. UZA3. Fundamentals of Ecology – Bs, Ms

23. UZD: Research Methodology and Theory of Science – Ms, Bc

► UZA3. Fundamentals of Ecology, 2.06-Ecology and environmental protection:

- Included to curriculum of 25Bs programs
- 120 study hoursequivalent to 4 ECTS.
- total number of students 1800 (all 2<sup>nd</sup> year students)

- ▶ UZD: Research Methodology and Theory of Science Provided at 1<sup>st</sup> semester of all master programs (25 program)
- ▶ 124 total hours equivalent to 4 ECTS
- ▶ Number of students = 65

<b>Courses</b>	<b>Study hours</b>	<b>ECTS</b>	<b>Number of students</b>
UZA3. Fundamentals of Ecology	120	4	1800
UZD: Research Methodology and Theory of Science	124	4	65
<b>Total</b>			<b>1865</b>

### 9.5 Survey of Students' opinion

The students' survey was directed to Bachelor and Master students of their final study year of the related fields and held in December, 2015. The survey has been answered by 75 students whereof 59 answered questionnaires were complete and usable for the analysis.

Detailed results of the survey are given below. The students answered mainly positive about their existing study programme with the majority of respondents choosing the respective value parameter of much/very much (on a scale ranging from 1=not at all to 5=very much or very true). However, the middle value parameter of 3 has been chosen by a significant amount of students summing up between 15 – 35% depending on the question. This reflects room for improvement of study content and teaching forms.

#### Selected survey results:

<i>Assessment of study programme and competences obtained</i>	<i>1 not at all; not applicable</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5 very much; very true</i>
Lecturers of my study programme are of high didactical expertise (n=59=100%)	0%	8%	23%	41%	15%
Supervision and guidance by lecturers was very good during my study period (n=159=100%)	1%	5%	21%	43%	18%
I have/had problems in following the subject matter during the courses (n=59=100%)	5%	13%	32%	26%	11%
I can/could choose from a multitude of course offers (n=59=100%)	13%	6%	25%	26%	17%
Technical equipment (presentation equipment, computer, copy machines, internet etc) is very good (n=59=100%)	3%	7%	23%	39%	16%





Subject-specific methodological knowledge was promoted during the study (n=43=100%)	1%	5%	35%	28%	13%
Ability to transfer knowledge (e.g. to apply existing knowledge to new problems) (n=43=100%)	1%	9%	25%	35%	13%
Environmental and sustainability studies (n=43=100%)	3%	10%	26%	32%	11%
Environmental economics(n=43=100%)	13%	10%	25%	24%	12%
Looking back, would you choose the same study programme / specialization again? (n=39=100%)	14%	9%	15%	25%	17%
	yes	no			
During the study programme I was able to work with practical / hands-on examples (n=75=100%)	59%	28%			