Impact and sustainability of Erasmus Mundus CASIA and TIMUR projects

Represented by individual results and achievements of grantees

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WAGENINGEN UNIVERSITY & RESEARCH

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A scholarship scheme for mobility of students was funded by Erasmus Mundus programme (2009-2013), the so-called Erasmus Mundus Action 2 (EMA2). The research performed by grantees during mobility was (partly) funded by EU host universities.

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The aim of this publication is to summarize the main results of 8 years Erasmus Mundus Partnership projects leaded by Wageningen University, Department of Environmental Science. From 2010 till 2018 Department of Environmental Sciences was leading CASIA and TIMUR projects within the framework of EU ERASMUS Mundus program involving partners form Kazakhstan, Uzbekistan, Kyrgyzstan and Tajikistan - www.eu-casia.org and www.eu-timur.org. CASIA and TIMUR projects wider objective was the establishment of a sustainable / operational network for academic exchange between Central Asia (CA) and European countries with a view to creating centres of excellence. Projects granted scholarships for students at Undergraduate, Master, Doctorate, Post-Doctorate level and Academic staff to come and study at EU partner universities. The study periods covered by scholarships vary from 1 month (for academic staff) up to 3 years (for Doctorates). CASIA and TIMUR Partnerships (2010-2018) offered in total 427 scholarships on different levels for which EU Erasmus Mundus program allocated a total budget of 8.4 million Euro. In this report, CASIA & TIMUR grantees – students and academic staff - are presenting their individual experiences, results and impressions achieved during academic mobility to Europe in the period from 2010-2018. The individual benefits of each grantee are very important for personal development, professional career and international cooperation.

Keywords: academic mobility, international cooperation, Bologna Process, scholarships

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1 Quality Assurance in International Academic Mobility - experience form ERASMUS Mundus CASIA and TIMUR Partnership projects

Ewa Wietsma-Lacka[1], Tlektes Yespolov[2], Marina Alexeyeva[3], Alim Pulatov[4], Mashkura Fakhrutdinova[5]

1.1 Introduction

This article presents results and experiences achieved during implementation of several Erasmus Mundus Partnerships Projects funded by European Union in the period from 2007 till 2017. The Erasmus Mundus program aimed to enhance the quality of higher education and promote dialogue and understanding between people and cultures through mobility and academic cooperation.

Erasmus Mundus projects were using different types of scholarships as tool to create Partnerships between European and non-European higher education institutions.

International Academic Mobility Network with Russia – IAMONET I, II,III, IV and V[6] projects, were Partnerships between EU and Russian Higher Education Intuitions (HEI) in the period from 2007 till 2017. IAMONET wider objective was fostering the cooperation of the HEIs with the business sector and building a research network for PhD candidates in the field of agriculture with a special focus on topics related to "Rural Development in Russia" and topics in the field of "Bioeconomy". Within the framework of IAMONET a total number of 1216 mobility flows were implemented as specified in Table 1.

Table 1 *Implemented mobility flows within IAMONET projects in the period from 2007-2017*

IAMONET	BSc	MSc	PhD	PD	AS	Total
I	90	69	44	26	34	**263**
II	81	71	36	19	26	**233**
III	90	67	39	12	23	**231**
IV	88	62	51	16	26	**243**
V	77	60	49	26	34	**246**
Total	**426**	**329**	**219**	**99**	**143**	**1216**

Central Asia Student International Academic exchange with EU - CASIA I, II, and III[7] projects wider objective was the establishment of a sustainable / operational network for academic exchange between Central Asia and European countries with a view to create centres of excellence. CASIA projects focused on agriculture, life sciences, trans-boundary natural resource management, climate change and environmental practices required for mitigation of consequences of the Aral Sea disaster and finding solutions for increasing competition between CA countries for water, e.g. in a view of

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[6] SGA 2007-1235; SGA 2008-1957; SGA2009-1681; SGA 2010-2361; SGA 2013-2520
[7] SGA 2010-5015; SGA 2011-2579; SGA 2012-2629

agriculture and energy production. A total number of 302 different type mobility flows were implemented in the period from 2010 till 2017 as shown in Table 2. A total budget of 5.761.513,00Euro was allocated for CASIA I, II and III project.

Table 2 *Implemented mobility flows within CASIA projects in the period from 2010-2017*

CASIA	BSc	MSc	PhD	PD	AS	Total
I	25	22	15	9	19	90
II	29	19	20	9	19	96
III	34	26	25	7	24	116
Total	88	67	60	25	62	302

Training of Individuals through Mobility to EU from Uzbek Republic – TIMUR[8] [8)] project linked the fields of education, technology, research, business and entrepreneurship, to produce new innovations and introduce them to Uzbekistan. The TIMUR project introduced the new cooperation patterns and fostered the academic Partnership through education and research on the related topics.

TIMUR Partnership addressed the following thematic fields of study: Agricultural Science, Climate change, Sustainable Energy, Natural Science, Social Science and Geography.

A total number of 125 different type mobility flows were implemented in the period from 2013 till 2018 as shown in Table 3. The total budget of TIMUR project was 2.585.900,00 Euro

Table 3 *Implemented mobility flows within TIMUR projects in the period from 2013-2018*

TIMUR	BSc	MSc	PhD	PD	AS	Total
Total	27	37	22	16	23	125

The wider objective of Erasmus Mundus Partnerships was very relevant in the context of modernisation of partner non-European Universities and adaptation of their education capabilities towards reformed countries economy in the region.

An added value of Erasmus Mundus was adaptation of EU Universities towards intensive academic student and staff exchange with non-EU countries.

1.2 Bologna Process in a short

Widely differing education and training systems in Europe have traditionally made it hard for Europeans to use qualifications from one country to apply for a job or a course in another. At present 43 different education systems covering 38 EU countries can be found [1]. Higher Education is closely connected to the economic development of each country. EU countries are responsible for their own education and training systems, but the European Union helps them set joint goals and share good practices [2].

In June 1999 in Bologna, 31 European Ministers of Education signed joint declaration European space for higher education. The declaration reflects a search for a common European answer to common European problems. The five main objectives of the declaration are:

- adoption of common framework of readable and comparable degrees
- the introduction of undergraduate BSc and postgraduate MSc/PhD levels
- ECTS compatible credit systems

[8] SGA 2013-2723

- a European dimension in quality assurance
- promotion of the free mobility of students as well as trainees and graduates [3]

During Bologna process several tools were developed which make it easier to understand the working of higher education systems in the EU countries and so to make it easier for people to move from one country to another to study.

In this regard the European Union – Bologna process, supported development of several practical tools to enhance transparency in higher education. These include between the others:
- The European Credit Transfer and Accumulation System (ECTS)
- Course catalogue
- The Diploma Supplement (with transcript of records)
- Learning Agreements

1.3 Type of scholarships offered by Erasmus Mundus Partnerships

Partnerships projects offered scholarships for students and staff at five different levels: Undergraduate, Master, Doctorates, Post-Doctorates and Academic staff. The duration of scholarships varied from 1 months up to 36 months depending on the type and the purpose. In this regard:

Undergraduate – BSc - fellowships
Scholarships from 6 up to 10 months were allocated for students to study as exchange students at EU universities during theirs regular program at home university. Mobility of undergraduates (BSc) offered the opportunity to live in international environment during their regular study at home university, increase qualification and to establish their own scientific network. Students should obtain diploma/degree at their home university after return from mobility.

36 months scholarships were allocated for students to follow full BSc program at EU university and obtain EU degree.

Master – MSc - fellowships
Scholarships from 6 up to 10 months were allocated for aplicants to study as exchange students at EU universities during theirs regular program at home university. Exchange students obtained diploma at their home university.

12 and 24 months scholarships were allocated for diploma seeking students who could complete full MSc program at EU universities (following one or two-year programs) or obtain double degree (two diplomas: one from EU and one from home university) within the framework of existing agreements between EU and partner university on double degree master programs (one-year study at home and one year at EU university).

Doctorates – PhD- fellowships
24 and 36 months PhD mobility grants offered students/young academic staff from partner country the possibility to obtain an European PhD degree with join supervision from home and EU academic staff (sandwich construction), and enhanced establishment of international academic cooperation capacity.

6 or 10 months PhD mobility flows were allocated for students to study/perform research on specific topic at EU university during theirs regular PhD study program at home university. Students should graduate after return at home university.

Post-Doctorates PD- fellowships
6 and 10-month mobility grants offered applicants with PhD degree to perform study and research to deepen their knowleg on specific topic at EU university, and to follow training on new teaching and research methods.

Academic staff - AS- fellowships
Scholarships from 1 up to 3 months were allocated for academic or administrative staff for training on new teaching and research methods, new advance courses and Quality Assurance systems with accordance to the Bologna Process, to get acquainted with project partners education systems or for teaching activity at host university [4]. This scholarships were also used for join supervision of Master or Doctorate students who were at that moment studying within the projects at EU host university.

It should be mentioned that for some regions like for instance Russia, projects could also allocate scholarships for all types of mobility from EU to Russia. This was not possible for project targeting Central Asia Countries.

1.4 Grantees Selection and implementation of mobility

To guarantee Quality Assurance of an International Academic mobility the special attention should be given at the several stages of the process - at the start of mobility (selection), during the mobility (student logging system) and at the end of mobility (graduation/recognition).

The selection of students for participation in both the undergraduate and the graduate program was primary based on the in situ legally approved selection procedures used by the involved partner universities. The Ministries of Education in the region established minimum requirements for universities to be fulfilled to have its titles and diplomas recognized. Selection procedure for student considered two main aspects: academic admission (first component) and selection for Erasmus Mundus scholarship (second component). The whole procedure consisted of various steps involving applicants and selection team members. [5]

The candidates applying for TIMUR/CASIA scholarships had to follow published on the website a step-by-step guide, check the academic admission requirements of the host university, fill in several forms and submit application package together with the required documents like copy of diplomas, passport etc. to the selection team for evaluation. The application forms could be direct downloaded from the project website.

Assurance of as impartial selection of candidates as possible was made by letting all final decisions be done by persons who do not know them and base the decisions on a combination of competences of the students (including academic background and language skills), their gender, eventual disadvantage and vulnerable situation. However, in case of Central Asia candidates from disadvantage group, opinion of person who knows candidates can be of big importance and have added value.

TIMUR/CASIA/IAMONET formal assessment for scholarship took into consideration both evaluation from home and host university of the applicant. The assessors use an assessment form to rate each of the following components: [5]

Undergraduate and Master	Home University	Host University
Strategic importance of the discipline coherent with TIMUR main domain	15	15
Academic merit (GPA, motivation, ...)	10	10
Diploma seeking	5	5
English knowledge	10	10
Other EU language knowledge	5	5
Other (extracurricular activities)	5	5
Subtotal	50	50
Final score		100

A final score was then awarded to the application based on the scores given to the above-mentioned criteria. Again, the following scores were available: *very satisfactory, good, very good* and *excellent*. The final mark always includes a short summary of the application file and a motivation of the assessment. The score has the following meaning:

A+	Excellent (100% – 90%)	an exceptionally strong candidate; definitely qualifies for a fellowship
A	Very good (75 % - 89%)	a very strong candidate but not necessarily exceptional; very likely qualifies for a fellowship
B	Good (65 % - 74%)	a good candidate who meets all requirements; may qualify for a fellowship, depending on the budget
C	Satisfactory (45% - 64%)	a reasonable candidate who falls just short of the requirements

To ensure quality of applications TIMUR/CASIA partners from region organised series of seminars focused on consultations and trainings of new candidates in writing applications, intercultural communications and preparation before mobility.

The Seminars contribute to the dissemination of TIMUR/CASIA achievements and preparation before study at EU Universities including new skills needed for self-study/independent study etc. [6]

The biggest challenge about the international student exchange is synchronization of different national education systems. Partners (universities and students) should be aware about the differences (like admission requirements, language of instructions, starting date of academic year, duration of undergraduate, master and doctorates studies etc.) and therefore the intensive information exchange was provided during project duration.

Implementation of mobility - student logging system- starts at the moment of formal registration of nominated grantee at host university. The programmes of the EU universities are all accredited and comply with the quality assurance procedures, which are necessary for accreditation. The programmes offered by non-EU universities are all accredited by the National System for Accreditation, supervised by the Ministry of Education. Students granted TIMUR/CASIA/IAMONET scholarships were official registered at their host university as regular or exchange students.

Undergraduate and Master students in order to be registered at host university, had to specify which study program, course they wish to follow at chosen EU university. Candidates must fill in application form, Learning Agreement and deliver copies of the diploma proofing the level & specialisation of the previous education. The admission committee of the chosen university evaluate if the profile/level of candidates match with the host university program.

All Undergraduate/Master students registered as exchange student at respective EU host university signed *Learning Agreements* (including courses to be followed) before starting of mobility. TIMUR and CASIA project had adopted common standard of Learning Agreement as shown below, by adding into it courses equivalence at home university to help recognition of archived results after mobility ending. [5]

Doctorates and Post – Doctorates students during application procedure, had to specify the research topic and agree on the program with an academic supervisor at host university, prior to the selection process for a scholarship. The research proposal had to be included into application form for scholarship.

Academic/Administrative staff was requested to fill in *Mobility Target Agreement*. This was the base of the individual activity at the host institution and it defined the targets of the individual to be achieved at the host institution and the measures how to meet the targets. [8]

During the mobility implementation phase the most important is evaluation and monitoring of the study progress. The efficiency of quality control was enhanced by making study advisors for Erasmus

mobility the entry address of a student to the university, and by them having introductory talks with the individual students at or shortly after arrival, setting academic targets, and monitoring student's progress towards this target. The internal quality control system of projects used systems which were already in place at host universities. The results of the internal quality control were first of all used to support/coach student during mobility implementation abroad, aiming on successful implementation of mobility. [8]

Learning Agreement for Undergraduates and Master

Academic year 20 / 20 - Field study

Name of student:		
E-mail:	Date of birth:	Gender: M / F
Home institution:		
Home coordinator:	E-mail:	
Host EU University coordinator:	E-mail:	

Study Plan							
Courses at Host University					Courses equivalence at Home University		
Subject code	Subject title	Period	Schedule	ECTS credits	Subject title	Subject code	ECTS credits

For the home institution			
Date:	Stamp:	Date:	Stamp:
Departmental coordinator's signature		Institutional coordinator's signature	

For Host EU University			
Date:	Stamp:	Date:	Stamp:
Departmental coordinator's signature		Institutional coordinator's signature	

, _____ _____

Place and date Student's signature

At the end of mobility – graduation - all students receive diploma supplement from EU Host University with transcript of record including marks and earned ECTS from the attended courses. In case the courses were similar to the courses at home university i.e. respecting the national standards of the specialisation, the positive results were recognized and included into study program of home university. In case the content of followed courses was different they were included into program as additional/optional courses and additional work load (credits) into the standard required program. In

Kazakhstan, at KazNAU, after international mobility, students could complete missing, obligatory courses during summer semester without additional tuition fee. Home universities, mainly in Kazakhstan and in some cases in Uzbekistan, recognized study of 24 undergraduate students who completed theirs CASIA mobility at EU universities. [7]

It is important to mention that the final recognition of ECTS after mobility was different in different Central Asia(CA) countries. Additionally, there are differences between universities within same country depending on the willingness of Deans and Rectors. In Kyrgyzstan ECTS were not recognized by home universities, as reported by student. In Kyrgyzstan the study-abroad period for exchange students is considered as an internship. However, the same student did not complain about it and stated that s/he graduated at home university with Diploma of Honour after return. Also, in Tajikistan ECTS are not being recognised by home university after student mobility. The best practice with recognition are observed at KazNAU in Kazakhstan and to some extension in Uzbekistan. [7]

In case students did not earned any credits during their international mobility, they could re-do exams after return to their home university and continue study. [6]

Recognition - in general all EU ECTS are recognized by partners universities but not always are included into regular study program due to the national standards. The same can be noticed also at EU universities which not always include ECTS from partner university.

New, advanced courses developed by academic staff during mobility were included by home universities into regular program.

During project duration CA partner HEIs revised the curricula allowing more flexibility and free choice subjects, with bigger attention and awareness of learning outcomes. Including more free choice subjects into regular programs could be solution for recognition /incorporating of ECTS into students' diploma in future.

Full EU Bachelor, Master and PhD degrees are easier recognized in partners countries. However, master diplomas with academic work load of 60 ECTS (one-year study) will be not recognized in CA where with accordance to national standards master diploma should have minimum of 120 ECTS. In this regard master students who thanks to CASIA scholarship competed successfully Double degree program and received 2 separate degrees diplomas, are in most favorable situation.

Looking at the practical aspects connected to the management of the international student/staff exchange several issues should be considered:

- There are different visa procedures for different EU countries and in some cases, it can take up to 6 months to arrange long term Schengen visa for applicant from outside EU;
- EU universities have difficulties to accommodate larger number of international students;
- Not all EU universities are offering studies in English language or the offer is limited to few Master programs;
- The bureaucracy connected to one student mobility is requiring more and more personal involvement and extra funds should be allocated to cover these costs at home and host universities to ensure smooth process.

The following recommendations for a future mobility scheme were proposed by CASIA project to Education, Audiovisual and Culture Executive Agency (EACEA) in Brussels: [7]

1. Undergraduate scholarships should be allocated for students only after 3 or 4 years of study.
2. PhD-scholarships for degree seeking applicants should be allocated for students with an EU MSc-degree or who completed part of their study program at the EU HEI during her/his MSc or BSc-education.
3. The most efficient and beneficiary use of a MSc-scholarship is for students following Double Degree programs.
4. During the selection/evaluation process both parties i.e. host and home university should participate and be actively involved.

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2 Impact of Timur Project on Education and Research: National University of Uzbekistan Experience

Tokhtasin Abdrakhmanov[9], Ewa Wietsma-Lacka[2], Mashkura Fakhrutdinova[1], Zafarjon Jabborov[1], Khaytbay Artikov[1]

2.1 Introduction

In the current paper, the broad experience and achievements through the partnership in the period of implementation of CASIA and TIMUR Projects of Erasmus Mundus Partnerships funded by EU are illustrated taking into consideration of the best achievements of HEIs in EU on the higher education and international student mobility.

2.2 Recognition of studies

The educational systems of most European universities differ from the system National University of Uzbekistan (NUUz) experiences now. The education at NUUz is based on four years study period in Bachelor and two years in Master programs. Students are assessed in disciplines on the scales of rating system and at the end of each semester the final exams are passed. At NUUz, students in the first year are taught the general professional subjects such as history, law, mathematics, philosophy etc. Then, from the second year, they start studying the specialized disciplines. Here, the taught disciplines of life sciences are mostly different, but in economic or mathematic disciplines they fit in more than 50 percent cases with the programs taught in EU HEIs.

However, while working in the Partnership network of TIMUR Project, NUUz has recognized short-term mobility (6 months or less) grantees' completed subjects. For example, exchange student of the Faculty of Economics of Czech University of Life Sciences (CULS Prague) Mukaddamkhon Saidrasulova collected credits from her chosen 6 subjects. Of them three were recognized at home university and three that were different the subjects taught at her university of origin have been retaken after coming back home university. Finally, without losing any additional years, she graduated her bachelors study at NUUz at the same semester.

The disciplines taught on Bachelor's and Master's Programs of NUUz in 2016-2017 were partially equalized to the disciplines taught in the leading HEIs of EU. For example, in the case of exchange bachelor student Nodira Abdurakhimova, three out of six subjects chosen by her were the same ones taught at UH and NUUz. In the case of full difference of disciplines, the students have completed them during an additional year.

Gender balance was sufficiently promoted in order to reach transparency of the selection procedure by means of accepting all of the applications sent. Besides, evaluation of applicants was performed using presentation method as well as their language abilities. In proper selection the economically

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[9] Coordinator's Assistant of CASIA/TIMUR projects, Associate professor of Soil Science Department at National University of Uzbekistan
[9] Coordinator's Assistant of TIMUR project , Assistant Teacher of Soil Science Department at National University of Uzbekistan

disadvantaged and disabled group of people was given a preference so that they could get higher score or evaluated in privilege than others (for example, Khasanova Nishonoy).

The long duration (10 months or above) mobility students continued their studies with additional semesters to complete the requirements of the course they chose at home university from where they paused. It could be stated in the example of students Nishonoy Khasanova (graduates in summer semester of 2017-2018), Nodira Abdurakhimova and Jamol Mattiev. The students for degree seeking such as Zukhriddin Nabiev, Muzaffar Muminov, Jaloliddin Khudoyberganov, and Abdurashid Bozorov are currently continuing their studies at those Universities of the EU where they implemented mobility.

Measures against brain drain were effective when we submitting a tripartite agreement on ensuring return after study of exchange students, this in the case of Abdurashid Bozorov who is continuing his mobility as a master student at Hohenheim University, Germany has succeeded.

2.3 Academic mobility and career

TIMUR Project has positively impacted for almost all grantees from NUUz for achieving success in academic continuousness and career building after mobility. For example, one students are completed his Master's course and obtained Master's Diploma. After mobility, a student is succeeded in her academic study. After mobility, four students are continuing their academic career at the HEIs of EU and this would be a strong bridge in sustainability of the partnership achieved.

Current activities of grantees those are continuing their studies and completed their mobility are stated in numbers below.

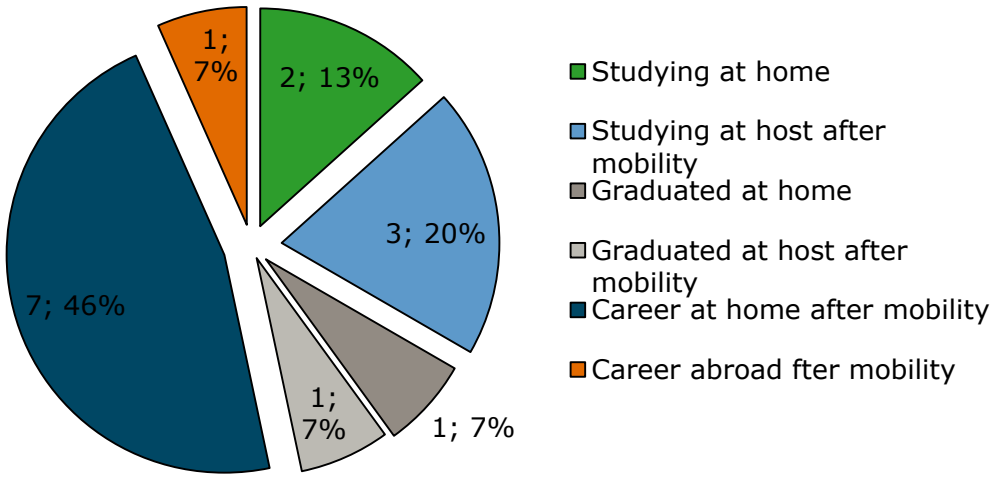


Figure 1 *Number of grantees that studying and working*

Good examples of individual impact of TIMUR Project are joint publications with EU Professors, defense of doctoral dissertation by Postdoctoral grantee Zafarjon Jabborov in 2017 and enhancing career building of Erkin Karimov by giving lectures at Amman Sultan Qaboos University after his mobility. Besides, according to the experience gained during working in a TIMUR alumni and partnership network, TIMUR coordinator at NUUz Dr. T.Abdrakhmanov has written a contribution in FAO's monograph in authorship in 2016.

Project is also enriched the grantees' international viewing on cultural benefit by organizing cultural events and international communications. Grantees could learn wealth European history, culture and language. Simultaneously, grantees demonstrated their home country and university as well as

celebrate national holidays (Navruz) and prepared traditional meals (Plov) in multicultural atmosphere with tolerance and love.

2.4 Institutional changes

The most important change made by TIMUR Project alumni in NUUz is to establish an International Students Association ISA - running initiative that wants to support the integration of foreign students at the university. Main goal is the enhancement of mutual understanding and establishment of international contacts among local and international students.

Figure 2 *Logo of International Students Association (ISA)*

After analyzing the experience of European universities, the taught subjects of various programs at NUUz have been compared to the subjects at the curriculum of HEIs of EU and changes were made about more than half disciplines with focus on the literature published abroad. Besides, teaching and research methods of European Universities are studied and this will serve as a fundament for introduction of Module system and Credit system in the educational sector of NUUz in near perspective.

2.5 Project Benefit

In the partnership the individuals of NUUz including bachelors, masters, doctorates and staff have had great experience and gained specific knowledge on their field of interest focusing on career building through academic perfection. The areas of the impact of the individual mobility in capacity-building of NUUz can be considered as joint publication in peer reviewed journals, gathering experience in laboratory and field research activities, updated teaching methods as well as dissemination of the culture and traditions of home country which may help to increase the attractiveness of Uzbekistan for perspective academic cooperation. Based on joint research work at host universities, grantees especially masters and staff strengthened cooperation in departmental level between universities.

Another individual impact of TIMUR Project on NUUz grantees is that after mobility, the grantees have published more than 10 articles in peer reviewed journals in authorship and participated at about 10 international conferences.

For the sustainable partnership after the TIMUR Project cooperation, NUUz participated in such Projects as ‘New and Innovative BA/MA Courses for Precision Agriculture’ and ‘Reconstruction of

International Departments though Academic Training and Evaluation' of Erasmus+ Key Action 2 that this ensures continuousness of the partnership after the grant end.

Besides, bilateral cooperation between the Faculties of Biology and Geology of Warsaw University Poland and the Faculty of Biology of the NUUz for the unpaid exchange of students on practice are agreed to force from 2018-2019.

Based on gained experience, there has been signed bilateral cooperation agreement between the University of Granada and NUUz on Erasmus+ Key Action1 Credit Mobility in 2017. This is a new platform for realization of achievements from TIMUR Project in a line of international student exchange and staff training with much focus on academic perfection.

In conclusion, we may with honor say that the TIMUR Project improved the leadership of students and researchers, increased visibility and international rank of NUUz, forced cooperation on joint publication and joint supervision and opened wide opportunities of partnership in international student exchange with focus on academic perfection.

3 Benefits Reports

Name Gulzoda Mukhammadjonova

Home University	Kokand State Pedagogical Institute
Host University	Adam Mickiewicz University in Poznan
CASIA Individual Mobility Type	Undergraduate Student
Duration	9 months 2016-2017

My staying and studying in Adam Mickiewicz University brought me a lot of experience and opportunity. I persuaded myself that studying in EU can also give plenty of good consequences in my future life as CA. I am grateful that I had opted for choosing exactly this University to study. I have studied, attended a lot of different aspects of English and participated in the exams of these aspects.

For instance

Titles of the course unit	Duration of course	ECTS Grades
1. English as a Foreign Language, Grammar, Writing, Speaking, Pronunciation, Integrated Skills.	2S	C
2. Phonetics and Phonology of English Languages	2S	D
3. Introduction to Language Acquisition	2S	E
4. Introduction to Linguistics	1S	C
5. History of British Literature	2S	C
6. Cultural Studies of English Speaking Countries	1S	C

I have studied Spanish and Polish in the level of Elementary by using my staying here beneficially. As our dream being a good-Qualified Teacher in Future has caused to come here, this is why I have attended the practical course of Teaching Practise at School. I think that it is the most significant for me to observe and learned new methods.

Polish language	2S	A
Spanish language	1S	A
Teaching practise at school	1S	A

I have gained 52 ECT but my academic performance is not so well. I had some kind of difficulties in some aspects like Phonetics and Phonology, Pronunciation. Teachers are so experienced, they helped me to correct my poor accent. Actually students don’t study the accent of British and American separately in CA, this is why I have faced to a lot of challenges of pronouncing sounds as a native English speaker. To come sure, diving into groups such as British and American is the most suitable way for students. Most of the students have to study some unimportant subjects as well in most of CA universities. For example, our Departure is English but we have to study Mathematics, Physiology of the young, safety of life, Spirituality and Sociology. Sometimes, we are demanded to write a lot of materials from these subjects included 29 or 32 sheets at least. Preparing these materials takes a lot of efforts, we don’t have enough time to improve our skills of English. To conclude EU universities can give opportunity as every student want. During our study we attended not only educational classes, but also we joined some conference which held in the University.

- We were invited to the international conference of tales and myths of all countries. The title of this conference was "Culture in the Melting Pot of Fairy Tales, "A Fairy Tale in the Melting Pot of Cultures" (happened 24- 25 of May).
- I was invited to attend in celebration of the opening central Library of Kalisz. It was devoted to International day of Odyssey. We read some fragments in different languages one by one. The Fragments were presented in Spanish, French, Polish, German, Italian and Turkish, Uzbek.
- The CASIA project was important for me to strengthen my communicative skills and all my abilities of studying. I wanted to study just the same educational system. I think that I achieved my aim totally here. So I now possessed informed interest to select best ways of studying LA. I met some new points of views of educational teaching and studying. In my opinion, I have seen some good cultural events also and I was successful to exchange our cultural with others.

Name	Gulbakhor Abdurakhmanova
Home university	Karshi Engineering Economics Institute
Host University	Wageningen University, NL
Type of mobility	Master mobility within TIMUR project, 12 months 2015-2016

Courses	Semester	Status	Grades
Research Methodology	1	Passed	**7.5**
Principles of environmental sciences	1	Passed	**6**
Integrated Water Management	2	Passed	**6**
Environmental Economics	2	Passed	**6.5**
Water Governance	3	Passed	**6.5**
Presentation Skills	3	Passed	**7.5**
Climate change adaptation in water management	4	Passed	**7.5**
Environmental quality and governance	5	Passed	**7**
Natural Hazards and Disasters	5	Passed	**6.5**
European Workshop	6	Passed	**7.5**
Master thesis: Adaptation pathways application in Kashkadarya River Basin			

Academic life

There are a lot of differences between the approaches and methods in learning process. For me it was a discovery to learn to work in groups. Group work is the ability of each group member to take responsibility equally for own part of the research and, at the same time to be consistent by content, subject with agreement with the whole group. So, group work which comprises of international students is a big challenge and pleasure. This experience allows to learn new insights, methods in analysing and different overviews to the same problem. This education definitely gives a good ground for future career. Independent thinking, allowing you to reflect your analysis teaches you to think objectively, independently without searching an assistance from anybody, work under deadline's pressure and simultaneously not losing the sense of humour. So, for future career all skills and knowledge acquired during the studies here will be a values benefit.

Personal life

Living independently without support of the family is for sure great achievement in life of every young person. But living alone in abroad requires even more capabilities such as to adapt quickly to different environment, language, culture and rules. I would notice that in such situation all negative experience related to painful adaptation plays very positive role in all aspects of life. Through experience people get knowledge. For example, to learn to ride a bike is not an easy lesson for those who never rode it before. But after few fails Negative experience convert into positive and useful skill for life. For me negative experience is missing my family a lot.

After return to home university

For completion of my Master programme at Wageningen University, NL I needed and wanted to arrange the prolongation of my studies. I did not come back yet to home university.

Name	Gulzoda Ergasheva
Home university	Kokand state pedagogical institute, Uzbekistan
Host University	Adam Mickiewicz University, Poland
TIMUR Individual Mobility Type	Undergraduate Student
Duration:	6 months 2016-2017

I arrived 15 September 2016 in Poznan and was accommodated in Student Dormitory. After two weeks I moved to Kalisz and was accommodated dormitory of University. Schedule of subjects were given by mgr Izabela Krystek and After I had looked through all subjects I chose these subjects:

5. English as a Foreign Language: Grammar, Writing, Speaking, Pronunciation, Integrated skills
6. Phonetics and Phonology of the English Language.
7. Introduction of Language Acquisition.
8. Introduction of linguistics.
9. Polish.
10. Cultural Studies of English Speaking Countries.
11. History of British Literature.

I have been able to attend almost all lessons and Exams began I passed them. Results of examinations are described this schedule:

Title of course Unit	Duration of course Unit	Local grade	ECTS Grade	ECTS Credits
English as a Foreign Language (writing grammar, speaking, pronunciation, Integrated skills)	1S	3	E	8
Phonetics and Phonology of the English Language	1S	3.5	D	2
Introduction to Language Acquisition	1S	3	E	4
Introduction to Linguistics	1S	4	C	2
Polish	1S	5	A	3
History of British Literature	1S	3.5	D	2
Cultural Studies of English Speaking Countries	1S	3.5	D	2

Studying in Europe is very different in some cases compared to my country. Education system is also different. Being on Erasmus gave me a chance of seeing real English atmosphere because here in Poland, I have few friends speaking in my native language, Uzbek, so I had to keep English all the time in order to communicate with others and it helped me to improve my language skills.

Besides, here I learned Polish language a little and it was very interesting for me.

As soon as I came to Poland, I met a lot of people and made so many friends. It helped me to understand how the world is big and socializing is important. Sometimes it was difficult to understand another culture, however I think I could deal with it.

If I was given another chance, I would certainly apply for Erasmus program with pleasure.

Name	Karieva Matlubakhon
Home University	Namangan Engineering Pedagogical Institute
Host University	Czech University of Life Sciences, Prague
Type of Mobility	Academic Staff
Duration of Mobility	1 month 2016

The opportunity of my being selected as Academic Staff participant to stay at the Czech University of Life Sciences Prague, Czech Republic, within the framework of the EU Erasmus Mundus Partnership TIMUR project was an excellent experience for me. It allowed me to increase my knowledge in the Linguistics and English language teaching skills. The experiences abroad gave me a great number of opportunities to learn different teaching methods. I have attended lectures and lessons of many leading professors and teachers of CULS. The main thing I acquired from my attendance of the lectures, seminars and other classes was that I learned about different approaches to teaching, organisation and planning the lessons, communicating skills with the audience and research methods. I am very happy and thankful to Erasmus Mundus for this very useful and helpful opportunity given to me, because I learned many new things, met new people face to face and observed new place, culture and traditions.

My sincere appreciation goes to Professor **Milan Slavik**, Director of the Institute of Education and Communication at Mala Chuchle. I am very thankful to **Alan M. Westcott**, Lecturer of EAP, and also to teacher of English for IT, **Brett Gallagher,** for inviting me to their classes. Being at these lessons I learned quite a lot: how to organise a warm atmosphere in the lecture room, how to organise an interesting lesson, how to attract the students' attention, what kind of resources are more interesting for the students and many other things.

Besides this I had a chance to be present at a variety of events which were organised at the University during my visit. I joined many interesting and fruitful meetings and discussions such as my taking part in the international meeting and training of **ICT and New Media Teachers at CULS Prague, which was held between 17 and 20 October, 2016.** During the training I had an appointment with the teachers and senior students of the U3A, which was funded by the Erasmus+ programme of the EU. Actually it was very interesting for me to be at the presentations made by the teachers from the Czech Republic, Poland, Slovakia, Portugal and Turkey. I was very pleased to have a chance to observe an English lesson and then an ICT lesson in the group of senior students. At the end of this event there was an interesting debate with the senior students. This event was organised perfectly. The visits to the Petrin Hill, university greenhouses, university brewery and visit to the Zoo were organized during the event.

Another interesting event was "6th Life Sciences Film Festival" (International Festival of Documentary Films on Natural and Agricultural Sciences and Sustainable Development) which took place at CULS Prague from 17 to 23 October, 2016. During the festival I had an opportunity to see very many interesting films about new technology, science, as well as a number of films about scientific research.

In addition to this I spent a part of my time at the library of the institute. I got to know much about the resources of the library. I also visited the Czech National Technical Library, where I could see the resources, the conditions and comforts for the students and other visitors.

My special thanks to professor **Akshay Pottatthil** from San Diego University, California, who gave me another opportunity to attend his lecture on the 24 October. I was very impressed by the way he teaches, makes presentations, explains the subject using examples from real life, from the home and social situations, which made the students to understand the topic easily and immediately.

In respect to differences in the scientific work between the host and home universities, I have to mention the following things: the volume of the scientific work and the order of its presentation is

different. In the EU PhD study is controlled only by the supervisor, but in our university it's controlled by the Department of Research Affairs and Institutions.

I didn't meet any negative aspects, because during my stay abroad I've learned to work in the atmosphere which has many speakers of different foreign languages, I've learned a lot of teaching skills from the teachers who are native speakers of English. And I believe that this experience will be very useful and productive in my future career. I am going to apply for a TIMUR grant with a new topic to do another PhD.

Name	Katayeva Mukarram
Home University	Namangan Engineering Pedagogical Institute
Host University	Czech University of Life Sciences Prague
Type of Mobility within Timur	Academic Staff
Duration of Mobility	1 Month 2016

Spending time abroad during my studies I used the opportunities given to me by the Erasmus Mundus Timur project. I spent my time at the Czech University of Life Sciences Prague. It was very useful and pleasant for me to attend the lessons of the professors and teachers at CULS. It was a great opportunity for me to strengthen my knowledge, teaching and communicative skills.

During my studies here I was eager to attend the lessons of Professor **Milan Slavik**, Director of the Institute of Education and communication, the teacher of English for Academic Purposes **Alan Westcott**, teacher of IT English **Brett Gallagher**, and professor **Akshay Pattatthil** from California, San Diego University. It was a great opportunity to observe their lessons in order to learn the ways of teaching methods used in other countries. Observing their lessons helped me to learn from them a lot about teaching methods, lesson planning, relationship between students and a teacher. My special thanks to the professors for their advice, their help and their support. I am thankful to professor Milan Slavik for his attention and hospitality. I am also grateful to professor Alan Westcott for his advice, suggestions and encouragement.

I had a chance to visit the library of the University and the Czech National Technical Library in Prague. It was an extraordinary opportunity for me to see the resources of the CULS and NTL. I was at every section of the library and I was an onlooker who saw the resources and conditions of the libraries. I tried to spend as much of my time as possible there.

Besides this there were many other events and meetings in which I was able to participate:

1. 17-23 October there was one of the interesting events in CULS – " 6th LIFE SCIENCES Film Festival". I was able to see several films about science, new technologies, students' life. The films were performed in both the Czech and English languages.
2. 17-20 October there was an international meeting and training-digitally innovative –unique ones. I was invited to this meeting which was held at the Institute of Education and Communication at Mala Chuchle. This training course was an unexpected experience and something new for me. It was very interesting to have attended this training course, because it was organised very well. I had a chance to meet new people, observe the lessons as part of the group of senior students, to have an acquaintance with the teachers from foreign countries (Poland, Portugal, Slovakia, Turkey). The program of this event was very interesting and fruitful. I had an opportunity to see many kinds of presentations. They were made by the teachers from CULS, from the Institute of Education and Communication (Mala Chuchle), and from the U3A.

There were many excursions of the CULS and city (guided tour to the Prague Castle and the Old Town Square, tours to the institution greenhouses and brewery).

During my studies here I extremely wanted to attend the lessons of **Akshay Pattatthil** from California, San Diego University. It was a great opportunity to observe his lessons in order to learn other ways of teaching. I was very pleased to be at this lesson because I liked the method of his teaching very much. What I can say about the difference in the scientific work between the host and home universities. I mentioned that in the EU the research work is conducted in more practical ways while in my home institution the theory is partly divorced from practice. I saw only the positive aspects. My stay at CULS really made me to go ahead, the reason of this was that I met many new things for me: I learned new ways of giving lessons, a lot of kinds of teaching methods. In my future activity I'm going to use them, because I've noticed good results after using them by the teachers and professors in CULS. In future I would like to apply for a Timur PhD grant.

Name	Abdullayeva Saidakhon
Home University	Namangan Engineering Pedagogical Institute
Host University	Adam Mickiewicz University in Poznan, Poland
Type of Mobility within Timur	Academic Staff
Duration of Mobility	1 month 2016

I had the opportunity of being selected as Academic Staff participant to stay at the Adam Mickiewicz University in Poznan, Poland, within the framework of the EU Erasmus Mundus Partnership TIMUR project was a fruitful experience for me. It made me to increase my knowledge in the Linguistics and English language teaching skills. The experiences abroad allowed me to get a great number of potential to learn different teaching methods. I was at the lectures and lessons of many leading professors and teachers of the University. The main thing I acquired from my attendance of the lectures, seminars and other classes was that I learned about different approaches to teaching, organisation and planning the lessons, communicating skills with the audience and research methods. I am very happy and thankful to Erasmus Mundus for this very fruitful and useful opportunity given to me, because I learned many new things, I had an opportunity to develop my English language skills, I had an appointment with new people who speak English excellently and it was very pleasant for me to have many kinds of conversations with them, I met many international students who were very kind with me and it also was very pleasant for me to have a conversation with them in English, we had very fruitful discussion with them in English, and I realised that English is a strong and powerful bridge between the different nations in discussion and in solving of many kinds of problems.

I am very grateful to Professor **Piotr Luszczykiewicz**, Dean of the Adam Mickiewicz University in Kalish. I am very thankful to **Artur Skweres**, Lecturer of Cultural Studies, and also to teacher of English as a foreign language, **Anna Brytowska**, and to the teacher of English as a foreign language, **Izabella Krystik** and **Tomasz Kulka** for inviting me to their classes. Being at these lessons I learned quite a lot: the lessons were very interesting and full of interactive games, I learned how to organise a warm atmosphere in the lecture room, how to organise an interesting lesson, how to attract the students' attention, what kind of resources are more interesting for the students and many other things. The students were very active at the lessons and it seems to me that they are very alive and confident at the lessons. The methods of teaching made them to work at the lesson because of the pedagogical games.

Besides this I had a chance to be present at a variety of events which were organised at the University during my visit. I joined many interesting and fruitful meetings and discussions such as I had chance to meet with Professor **Jan Grzesiak**, Head of Teacher Education Department, with Professor **Michal Jarnecki**, Head of Culture Heritage Department, PhD **Magdalena Zdrowicka-Wawrzyniak** of English studies Journalism. During these meetings I had interesting discussions about lesson process and I had opportunities to ask many questions about the research works, the kinds of articles. They gave me their articles they had published before and I worked on them and made some analyses.

I had an opportunity to visit sightseeing's of Poznan and Kalisz with the students of the University, I was at the concert of the piano players which was held on the 26th of October. On the 1st of November there was a National Holiday **All Saint's Day** when we went to the cemeteries to light candles and pray for the ones who have passed away with Magdalena Zdrowicka-Wawrzyniak. On the 5th of November I was at the castle of Goluchow in Kalisz with Izabella Krystik. On the 2nd of November I was at Postawowej school number 12 and had an appointment with the Director **Malgorzata Galczynska.** On the 11th of November I was at the kindergarten "Pluszaki" and had an appointment with the Director of the kindergarten Natalia Abzdykiewicz with PhD Marianna Styczynska. On the 11th of November it was National Holiday Independence Day and I had a tour along the city with Izabella Krystik. On my free days I visited all the museums of Kalisz with I. Krystik.

In respect to differences in the scientific work between the host and home universities, I have to mention the following things: the volume of the scientific work and the order of its presentation is

different. In the EU PhD study is controlled only by the supervisor, but in our university, it's controlled by the Department of Research Affairs and Institutions.

I didn't meet any negative aspects, because during my stay abroad I've learned to work in the atmosphere which has many speakers of different foreign languages, I've learned a lot of teaching skills from the teachers who are native speakers of English. And I believe that this experience will be very useful and productive in my future career. I am going to apply for a TIMUR grant with a new topic to do another PhD.

Name	Arifjanov Aybek Mukhamedzhanovich
Home University	Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, UZ
Host university	Slovak University of Agriculture in Nitra (SUA), Slovakia TIMUR Individual mobility type Academician Staff
Duration:	2 months from 3.10.2017 till 1.12.2017

The purpose of my visit has two aspects: educational-pedagogical and scientific. I have fulfilled all my tasks under the guidance of my consultant at Slovak University of Agriculture (SUA) professor D. Húska and with the assistance of the local project coordinator F. Norbert.

In the educational and pedagogical plan: I attended in the classes of leading professors of SUA related to my activities in TIIAME. In particular, professor D. Húska's lecture has devoted to the problems of ecology and the economy of the future as well as professor Peter Fandel, whose lecture dedicated on mathematical statistics. The classes and courses of professor L. Jurík are in the field of water resources management and the construction of hydraulic structures.

I have discussed with the rector of the SUA, professor Peter Bielik, about the organization of the educational process and the education system in the EU, as well as the development of further cooperation between our institute (TIIAME) and the university (SUA). In addition, together with the doctoral students from Uzbekistan D. Abdullaev and K. Pirmatov, I have met with deans, deputy deans and professors such as A. Bandlerová, E. Horská, D. Igaz, M.Bihuňová, L. Lackóová, P. Bielik, B. Novotná.

To provide the educational process with educational materials, I have collaborated with professor L. Jurík and associate professor T. Kaletová, PhD in developing a joint textbook on the course "Hydromechanics" for bachelors. I express my deep gratitude to them for their cooperation.

I also attended a student festival "Visegrad Festivals" organized with students and professors from the countries of the Czech Republic, Slovakia, Poland and Ukraine. In my opinion, this creates good prerequisites for the further development of cooperation between universities and countries. Moreover, I participated the seminar "GIS Day" organized by the faculty. It was a very useful and informative event for students and young scientists.

In the scientific plan: I was acquainted with the research centre "AgroBioTech". The centre is equipped with modern equipment and technologies, which provide great opportunities to conduct scientific research in many areas of science. I have met with a number of scientists there. The excursion was guided by Mgr. Eva Kováčiková, PhD.

I have visited the exhibition of agricultural machinery organized by the Technical Faculty of SUA, where I was acquainted with the work of the equipment for assessing soil salinity as well as plant treatment. Such equipment is also very valuable in the conditions of Uzbekistan.

I visited the educational and production enterprise of SUA with the local project coordinator F. Norbert. During the visit, we were accompanied by Ing. Ph.D. Zh. Pruzhinsky. There I was acquainted with water-saving irrigation technologies and modern irrigation systems. In my opinion, these systems in certain areas of our republic can be recommended for the implementation.

I gave the presentation in front of master student on the study program "Water Engineering", as well as doctoral students and professors of the Faculty of "Horticulture and Landscape Engineering". I acquainted them with the water management system of Uzbekistan, as well as with the scientific developments of our faculty. I attended the scientific conference on the topic "Agrarian Law of the EU". As the result of the joint scientific cooperation with professor D.Húska, we prepared the scientific paper "Environmental Aspects of Sediment Regime in the Water Structures of Rivers in Uzbekistan" and with professor L. Jurík the scientific paper "Sustainable Regimes in Irrigation Canals".

During my research stay in SUA, I have acquired a great pedagogical and scientific experience, which is very useful in my work activities at TIIAME. Thanks to the Erasmus Mundus TIMUR project, I become more familiar with the system of the education and advanced technologies in the field of agriculture and water management in Europe. I also had a great opportunity to cooperate with colleagues in scientific and pedagogical activities. This experience contributes to the integration of education and science between our educational and scientific centres. Such projects are very important in acquiring useful experience and career growth. I would be happy to work on the project further. Thanks to the organizers of the project.

Meeting with the Rector, Dr.h.c. prof. Ing. Peter Bielik, PhD. (from the left side), Slovak University of Agriculture in Nitra

Presentation at the Faculty of Horticulture and Landscape Engineering, 9 November 2017

Visit of water objects to see techniques and technologies

Name	Guzal Abduraupova
Home university	Tashkent Institute of Irrigation and Melioration, Uzbekistan
Host university	Wageningen University, the Netherlands
Mobility Type	MSc Student 12 months 2015-2016

I studied in Environmental Science program, my major was Environmental System Analysis. Courses attended are the followings: ESA-20806 Principles of Environmental Sciences, YRM-20306 Research Methods in Environmental Science, ENP-34306 Environmental Policy: Analysis and Evaluation, ESA-22806 Environmental Systems Analysis: Methods and Applications, ESA-31806 Environmental Assessments for Pollution Management, CPT-24306 Risk Communication, ENP- 35806 Environmental Quality and Governance, ESA – 60312 European Workshop Environmental Sciences and Management. I have passed all the exams from the first try, no re-exams. In total I got 107 credits.

The difference between the EU and CA university life are the followings: At WUR the academic year is divided into 6 periods, at TIIM it is 2 semesters. At WUR the internet connection is very good, at TIIM there are only like 10-15 PCs with good internet connection available for students and no access to Facebook or similar websites. Relationship between students and professor at WUR are like they are friends, equal. At TIIM subordination is very noticeable. At WUR scores given more based on the final exam, at TIIM professor pay more attention on personal participation in classes during the whole semester. None of these differences are considered as good or bad. This is not the evaluation, just observation. As regards the graduation from one the best universities in the world, it will be definitely beneficial for my future career.

Turning to the personal life, I learned how to be more independent, understand people better, became even more tolerant. Now I know how to rationally behave when I am faced with difficulties. I experienced ups and downs, which made me stronger. It is difficult to arrive to WUR and manage a lot of things by yourself, without physical help. Also, a good point that I met lots of friends here, now I am a member of Green Office, Fossil Free Wageningen, Fencing Club Wageningen, HEMA club. I will not apply for both CASIA and TIMUR project again. I do not know for sure how my achieved results will be recognized at home university. In short, I am completely satisfied with mobility and thankful to both host and home coordinators for their kind support.


8th of December
Constitution
Day of Uzbekistan

Name	Nodira Abdurakhimova
Affiliation	Bachelor student from National University of Uzbekistan named after Mirzo Ulugbek
Mobility type and date	Undergraduate mobility (TIMUR) 01/10/2016-31/07/2017
Host university	University of Hohenheim, Germany
E-mail	abdurakhimova2893@mail.ru

Activities during the mobility: During my stay at the University of Hohenheim I had the opportunity to participate in several guest lectures by managers of German companies. As a member of the group Young International Managers from the module International management I could obtain useful data about worldwide company strategies for my graduate work. Besides I improved my skills from English and German languages.

Academic year 2016-2017 - Field of study Economics and Business Administration (Undergraduate) Courses at Host University:

- International Innovation Management
- International Management 1 (Credit Points 6,0)
- Economics of Innovation (Credit Points 6,0)
- Economic History and History of Economic Thought
- English language Course (B1) (Credits:4) / German language Courses (A2.1) (Credits:3,0)
- German Intensive language course (A2.2) (Credits:5,0)
- Basic Module Innovation Economics
- Basic Module International Business and Economics (Credit Points 6,0)
- Economics of Innovation 2
- International Management 2 (Credit Points 6,0)
- English for Business Communication / Deutsch Aufbaustufe 1 (B1.1) (Credit Points 6,0) / (Credit Points 3,0)

Obtained benefit from mobility: During my mobility I participated in lectures and tutorials which are directly depend on my field of study in my home university. I learned to be decisive, creative and innovative as people around of me were very motivating. Now I have experience for living and studying abroad. I hope it will help me in my future career.

Contribution to Uzbekistan: My field of study Personnel management is one of the developing specialties in Uzbekistan. Having foreign experience I have got ideas to improve this field beginning from University. I hope, I will add my own contribution for helping students who want to study abroad.

In the international department of NUU I started to establish International Students Association: a student-run initiative that wants to support the integration of foreign students at the National University of Uzbekistan. Main goals are the enhancement of *intercultural dialogue* and *mutual understanding* as well as the establishment of international contacts. Nowadays we have more than 50 members: about 30 native and 20 international students. Next academic years we are planning to increase the number of international students at NUU and for that we are working on new projects. For example, international dinner, international culture days, Buddy program, excursions around Tashkent. Beside that, we are working on summer school programs with our native members to attract more international students.

Logo of International Students Association (ISA)

Name	Shukhratjon Ochilov
Home University	Tashkent Institute of Irrigation and Melioration, Uzbekistan
Host University	University of Las Palmas de Gran Canaria, Spain
TIMUR Individual Mobility Type	Master Student
Duration	16 months 2017-2018

Below I am giving the list of courses I took at ULPGC and the corresponding results:

1. Tourism Analysis (Prof. Casiano Manrique, Prof. Carmelo Leon) - overall grade: 5 out of 10 (relatively low result due to my late arrival in Las Palmas);
2. Transportation Economics (Prof. Juan Carlos, Prof. Concepcion Roman) - overall grade: 8.9 out of 10;
3. Economics of the Global Environment (Prof. Jorge Arana, Prof. Carmelo Leon) – overall grade: 10 out of 10;
4. Demand Analysis and Forecasting (Prof. Concepcion Roman, Prof. Juan Luis Eugenio) – overall grade: 8.2 out of 10;
5. Service Quality Analysis (Prof. Teresa Aguiar, Prof. Sabine Haller) – overall grade: 7 out of 10;
6. Territorial Planning for Tourism and Transportation (Prof. Eduardo Caceres) – overall grade: 5.4 out of 10(Relatively low score because most part of the course was in Spanish);
7. Quantitative Methods (Prof. Rafael Suarez, Prof. Dolores Santos) – overall grade: 9.2 out of 10;
8. Cost-benefit analysis (Prof. Jorge Arana) - overall grade: 9 out of 10;
9. Master thesis under the supervision of Prof. Alim Pulatov and Prof. Carmelo Leon, as well as in close cooperation with Prof. Nicolai Potapushkin (ULPGC), Prof. Dilbar Aslanova (SIES) and Obidjon Khamidov (TSUE), and on the topic: The contribution of Ecotourism in the sustainability of the destination.

Differences between the EU and CA university life, differences in study organization: The education systems of both EU and CA have similarities and, undeniably, divergences too. Either focuses on preparing highly qualified specialists who are supposed to have competitiveness in current labour market. However, they do it not in the same way. To my mind, EU education system has more edges in providing flexibility for students, enabling them to follow their priorities and also preferable disciplines. Students feel free in deciding what course to pick, which professor to contact and even what time to study. Freedom is the main source of creativeness, what is not inherent in the latter one. Another substantial discrepancy, to my mind, is the motivation provided for the students. The academic environment created in my host university managed to motivate me in a whole different way, pushing me to grab everything I was offered. When it comes to CA education system, with all its precedential achievements and maintained traditions, it still fails to pay enough attention to the inspirations, motivations, expectations and overall mental state of the students. I came to realize these inconsistencies not only comparing abovementioned education systems or their syllabus, but rather by contrasting myself with my foreign group mates during my academic life at my host university. I could see how they outperformed me in many aspects ranging from more individual and critical thinking style to better time management and organizational skills, more active participation and communication skills what are so crucial for a tourism industry specialist. Nevertheless, this feeling of self-dissatisfaction urged me to spend my days and nights in the library, scrutinizing and working on my weak points. If before I had studied to be different, at that moment I was struggling not to be different, but at least to be equal. Last but not least, all-year-round seminars and lots of meetings with the experts of Tourism sphere, organized by both administration and professors, eventually inspired me for further PhD studies, what I was not willing before.

Benefits for my career: I would be more than happy if I could be useful and contribute to the current state of local tourism industry, at least in my city. Upon finishing my master studies, I cannot wait to return my home university for imparting an invaluable gained experience to students. Tourism turned out to be different from what I used to read in textbooks during my bachelor student years. This is what I am going to explain to freshmen of my university. I am sure that I can inspire and motivate them to plan their study period properly and participate in international study projects as I did. After taking my Master degree in Economics of Tourism, Transportation and Global Environment,

for some period I plan to teach at my home university SIES or TSEU as I already have invitations from both and since this is important for gaining required job experience for further PhD studies. Currently, in the International Tourism Departments of both universities, huge changes are taking place. I participated in the translation of new literature into Russian and Uzbek languages and will continue it. We are also planning to establish connections with the leading HEIs in tourism sphere for organizing short study trips of young researchers, financed by the government. Nowadays I am organizing the participation of TSEU professors and students in International Spring Symposium in ULGPC, helping them with all correspondence and documentation procedure. There are big – big plans regarding my return to homeland. The Master Degree I obtain, will be accepted by the Ministry of Higher and Secondary-Specialized Education of the Republic of Uzbekistan. It means that I can apply for PhD studies in my home country or can also be employed.

Personal life. Staying overseas, independent and out of comfort zone for a long time period, gave me excellent overall points about how I should spend my life further. I came to realize that independence is the responsibility for all steps you are taking now with the expectation of corresponding results in future. Time management is another beneficial lesson I learnt within my stay abroad. However, the most memorable experience which I appreciate a lot is my co-stay with people from different countries, religion, culture and background. Living how they live, thinking how they think, eating what they eat, understanding their values, celebrating their holidays, learning their sense of humour, becoming part of their family and just existing how they do it, were a lifetime memory. I understood why developed countries are developed and why undeveloped countries are undeveloped. Now I clearly comprehend what should be done for those undeveloped countries to become developed and how developed countries can contribute to it. To my mind, the most effective way to help them is actually not to give the right thoughts but to teach them to think in a right way. In other words, assisting in increasing the quality of education is the most valuable contribution EU universities can do for those in CA. In this sense, I am sure that the mission of Erasmus Mundus program and TIMUR project is successfully complete. Seizing the opportunity, I would like to express my endless gratitude to everyone who assisted in the realization of the project, additionally to home and host universities for their great support and hospitality. My special gratitude goes to Prof. Ewa Wietsma, Sofia Siemens, Valentina Grasso, Prof. Alim Pulatov, Prof. Carmelo Leon, Prof Nicolai Potapushkin, Prof. Concepcion Roman, Prof. Obidjon Hamidov and Prof. Dilbar Aslanova for their priceless guidance and endless effort.

During the course of Service Quality Analysis with Prof. Teresa Aguiar and group mates.

With Prof. Teresa Aguiar and groupmates during the teamwork: "Mystery Guest"- a group survey to analyse the service quality of 5 and 4 star hotels such as Club Hotel Riu Gran Canaria, Palm Oasis Maspalomas, Hotel Riu Palace Oasis, Hotel Riu Palmeras, Lopesan Baobab Resort, Lopesan Costa Meloneras Resort.

During the field trip to Caldera de Bandama

During the course of Territorial Planning for Tourism and Transportation with Prof. Eduardo Caceres and group mates.

Name	Subrob Bokiev
Home University	Karshi Engineering Economics Institute, Uzbekistan
Host University	Szent Istvan University, Hungary
TIMUR Individual Mobility Type	Bachelor student
Duration	10 months

I have taken those subjects for 1st semester and my results are:

1. Basics of EU studies - During the course I studied about functioning of the EU' s institutions and the methods of decision-making within the EU. Also separately analysed the function of the European Parliament, European Commission, Council of the European Union, European Council etc. My result is- Pass
2. International Economics - These subject helped me to improve not only my English and also vocabulary of terminology, also my speaking. My result from this subject is- Satisfactory
3. Basics of Law and Economic Law - Excellent
4. Basics of Leadership and Management - Good
5. Economic History - Satisfactory
6. Information Technology and Database Management - Excellent

2nd Semester: I have taken those subjects and my results are:

1. Management of Small and Medium Enterprises - This course provides students to acquire the fundamentals of marketing through getting to know customer satisfaction, segmentation, and consumer behavior and market analysis. My result is - Excellent
2. Finance - This course gave me knowledge about general finance concepts, discusses financial system, and in detail the financial policy subsystem, its device system, and its effects on the economy- Good
3. Business Economics and Management - The objective of the subject is to explore the interaction of organizations and their environment, the allocation of resources, and the consequences of business decisions for individual organizations. I could improve my abilities of analyzing the different interactions and decision-making, and dynamic way of thinking - Excellent
4. Business and Organizational Sociology Good

Differences between the EU and CA university life, differences in study organization: As a student of Karshi Enginee1ing Economics Institute I had an opportunity to see the differences between Universities of CA and EU countries. There are lots of differences between EU Universities and CA university life in different aspects. The most important difference is in teaching methodologies.

If the CA universities prefer old theoretical education only, the EU universities prefer to make classes more interactive and based on practice which helps to obtain all information of the subject. It is very important difference because, with theoretical classes only it's difficult to obtain the topic and handle it as it is needed. The topics always remain unclear. On the other hand EU universities are more likely to use different presentations, video-clips from real life and business environment for practical explanations. EU universities give great importance to attendance of students in study process not only physically, but also mentally and intellective. Also in CA universities teachers are not willing to hear personal opinions, comments or new ideas from students during classes. In distinction students are highly expected to give personal contributions to the study process, their personal background, ideas, thoughts, opinions are interesting and important for everyone in EU universities.

One of the main differences is the flexibility of classes. In EU universities the schedules for classes are more flexible, sometimes there is one class in one day or when you have 2-3 classes there enough time for brake between them. During classes teachers notice when students are tired and give brakes independently which helps to stay concentrated on the topic issued during the classes.

All these differences are typical for my host m1iversity and my university in Uzbekistan also.

Benefits for my career: One year of exchange program that I held in Szent Istvan University and generally in Hungary gave me unique knowledge, vision and experience in many meanings. First, it broadened my vision about the fields that I study. Although I took some of the subjects I was thought here in my home university also, I clarified my field in Szent Istvan University more than in home university. Education that I got here in one year didn't give me only knowledge, but also I learned the European mentality of thinking, their approach to different issues, I could acquaint with their culture, The skills and abilities I improved or learned here will be very beneficial in my future career. I could see the differences between local companies and European companies, about management styles and administrative methods. It will help me much in my career to use all the knowledge and skills that I learned here.

Personal life. During one academic year Szent Istvan University provided enough academic events for us to improve ourselves and gain expe1ience. Enough number of field trips were organized by the administration of faculty, and also by the professors in different subjects. These field trips gave us valuable experience. Field trip to the local plant of "Bosch" is a good example for it to describe the importance of such experience whereas "Bosch" is one of the giant companies as it is known. In such nips we could acquaint with the modem innovations and technologies, also production process of big companies.

Furthermore, faculty management often give us opportunities to attend in different international conferences. Such conferences with attendance of great professors, governmental faces and CEOs help us to improve ourselves. ”Innovation and incubation policies on the national level, clean-tech model interpretations" Conference organized by the SZIU Climate Change Economics Research Centre can be a good example for such conferences.

Moreover I could benefit from the International workshops organized in other European countries. It helped me to improve my skills, to acquaint with education methodologies and business approaches of other universities also. International workshop on "Strategic Management" in Poznan, Poland was one of such workshops in which we could exchange our knowledge’s and experiences with foreign students from different countries and different universities like, Germany, France, Finland, Russia and etc.

I would like to apply again for Erasmus Mundus grant programs!

After conference: Faculty of Economics and Social Sciences Vice-dean for International relations Dr. Henrietta Nagy and me

My ERASMUS friends

Szent Istvan University Gollaball party with international students

My supervisors

Sports day we are 2nd place for football

Name	Alisher Nabiev
Home university	Tashkent Institute of Irrigation and Melioration, Uzbekistan
Host university	Slovak University of Agriculture in Nitra, Slovakia
TIMUR Individual Mobility Type	Student (bachelor)
Duration	10 months 2014-2015

At the end of two semesters, I have collected the number of credits and passed the exams. Overall, I scored 42 ECTS credit for 10 disciplines.

The program is very intense, a lot of independent work, both group and individual, student workload is lower, but, students have more free time for individual study subjects. As for the university, I studied. I can say that for students they created a very friendly and welcoming atmosphere. Academic freedom of students. Scientific bases and laboratories, library and music library offers excellent opportunities not only for professional self-improvement. Students and teachers agree on the day, time and audience for training.

Throughout academic exchange programs, I got a big linguistic experience in dealing with international students, visiting classes, expanded my horizons, learnt a lot of interesting things and meet people from all around the world, and naturally, I have acquired skills in communicative terms. This program allows you to get a great deal of new knowledge in the specialty, and how to learn a foreign language test and temper their character. This is an everlasting experience. Probably each of us will remain in the memory of their own, unique experience, but it is clear that this will be one of the highlights in the life as a unique program which pushed me to be more confident and gave new strength to achieve my goals in the future. Speaking of the negative side, honestly, I cannot identify any. Because the country and the people are very friendly and Slovakia is rich in history and culture as well as, there are many beautiful cities, castles and unusual nature and all the above-mentioned facts makes the program perfectly well-worthy. It goes without saying that in the future I will try to put all my experience and knowledge into practice.

After returning home, I went to my institute and showed my results to dean and to my home coordinator at once. Since I am a startup bachelor in my university who attended in this program, I think, the skills and the experience that I got are not only important for me, but for my institute and to throughout my later studies, my TIMUR experience will definitely help me to overcome any academic obstacles.
In conclusion, I would like to express my gratitude to the university administration and providing me the opportunity to study abroad. The experience I gained during the program, are vitally important on both a professional level, and personal. With this opportunity, students of our university can explore new horizons for the development, both for the university and for themselves.

Name	Isokjon Pozilov
Home University	National University of Uzbekistan, Uzbekistan
Host University	Adam Mickiewicz University in Poznań, Poland
Type of mobility within TIMUR	Master Student
Duration	From 10.09.2015 till 10.08.2017 (23 months)

I arrived in Poland on the 10.09.2015 and on the 3rd of October, the study year began. Initially, I was supposed to finish my mobility in 12 months' time, but after finishing the first academic year in Adam Mickiewicz University, I decided to extend my mobility in order to finish my Master thesis and gain Master's degree of the university as the university offered better education and better facilities. My master thesis is titled as " Photoinduced, covalent end closing of DNA hairpin modified with 5-fluoro-4-thiouridine". I had successfully completed the thesis by June of 2017 and defended it with very good grade in that month. After passing all exams successfully, I received Master's degree diploma of AMU in July. I attached a pdf file, showing all the classes and courses I attended in both academic years with the gained grades and credits.

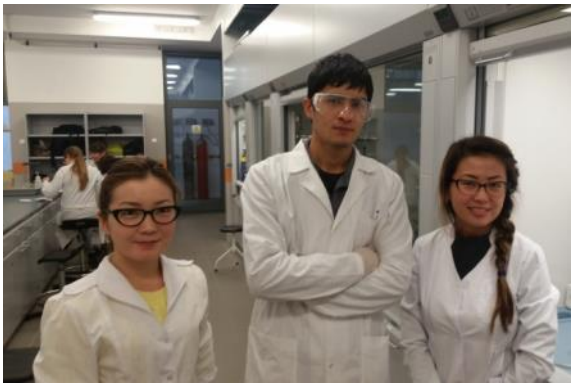
Education system of Poland Universities, generally, European Universities considerably differs from the education system of Uzbekistan. Evaluation system of students is more convenient and simple in European Universities. In Uzbekistan, there is no Credit system. Usually, students are evaluated by the special ball system consisted of 100 balls in total (100 - the highest, 56 – the lowest pass point) While, here, in Poland, students collect ECTS credits which is more clear and certain. Non-special subjects are taught optionally in Poland, but in Uzbekistan we would study non-special subjects obligatorily too. There is variety of options to choose the optional courses to obtain the needed amount of ECTS points so that it gives a student an opportunity to use his/her time wisely according to his/her interests. The less number of students in a group enables teachers to work with every student thoroughly and practically, a teacher has more time to talk about the achievements and gaps to be filled of a student. I noticed that my host university, AMU, generally, the universities in Poland have less financial problems. Subsequently, they can afford to buy many comfortable and modern laboratory facilities. Besides, universities have close relations and partnerships with many other universities, so that there are great number of exchange students and very nice international atmosphere. All above mentioned features improve the quality of education, letting students spend most time qualifying for their profession. Above mentioned differences are given in the example of my faculty. Probably, other faculties also have some kinds of differences.

I think, my best achievement in my mobility was I qualified the Master's degree of AMU. However, it is to mention that I could use my mobility more wisely participating in scientific conferences and many workshops. I advise to the next comers to use their time wisely and effectively.

In addition to travelling, living abroad means getting acquainted with another culture and mentality. Erasmus gave me the chance of integrating with the people of which do not belong to the group of people I used to be in my country. I have met a lot of Erasmus students from various countries and become life-long friends with them. Subsequently, my worldview had been improved progressively. This is the most unforgettable part of Erasmus. Additionally, being in a high level scientific atmosphere of the university helped me to decide about continuing and seeing my future career in science.

Chemical technology students' laboratory room

During an integration activity with Erasmus students



During a laboratory class with teammates

Name	Nurbek Odilov
Home university	Karshi Engineering Economics Institute, Uzbekistan
Host university	Szent Istvan University, Hungary
TIMUR Individual Mobility Type	Bachelor student.
Duration	10 months 2014-2015

Academic performance. I have taken those subjects for 1st semester and my results are:

1. Basics of EU studies - During the course I studied about functioning of the EU's institutions and the methods of decision-making within the EU. Also separately analysed the function of the European Parliament, European Commission, Council of the European Union, European Council etc. My result is Good.
2. Business English I - These subject helped me to improve not only my English and also vocabulary of terminology, also my speaking. My result from this subject is Excellent
3. Microeconomics - Excellent
4. Economic Psychology - Satisfactory
5. Basics of Environmental Management - Excellent
6. Economic History - Pass
7. Business Mathematics - Good
8. Informatics and Database Management - Pass

2nd semester I have taken those subjects and my results are:

1. Business Mathematics II – Main topics of this course are: linear space, vectors, change of basis, definition of linear equations and matrices, systems of linear equations. My result from this subject is - Good
2. Marketing - This course provides students to acquire the fundamentals of marketing through getting to know customer satisfaction, segmentation, and consumer behaviour and market analysis. Excellent
3. Basics of Finance - This course gave me knowledge about general finance concepts, discusses financial system, and in detail the financial policy subsystem, its device system, and its effects on the economy. Satisfactory
4. Statistics I. I studied in this subject calculation of the math expectation from a sample, Calculation of the variance from a sample, Bessel correction, Steiner theorem, Average, Median, Graphical representations and also Population, Measure of central tendency, Measure of dispersion, etc.– Satisfactory
5. Business Economics - The objective of the subject is to explore the interaction of organisations and their environment, the allocation of resources, and the consequences of business decisions for individual organizations. I could improve my abilities of analysing the different interactions and decision-making, and dynamic way of thinking. Excellent
6. Business and Organizational Sociology - Pass
7. Business English II. – Excellent

Differences between the EU and CA university life, differences in study organization: There are lots of differences between EU Universities and CA university life in different aspects. The most important difference is in teaching methodologies. If the CA universities prefer theoretical education only, the EU universities prefer to make classes more interactive and based on practice. It is very important difference because, with theoretical classes only it's difficult to obtain the topic and handle it as it is needed. The topics always remain unclear. On the other hand EU universities are more likely to use PPT presentations, video-clips from real life and business environment for practical explanations. EU universities give great importance to attendance of students in study process not only physically, but also mentally and intellective. Also in CA universities teachers are not willing to hear personal opinions, comments or new ideas from students during classes. In distinction students are highly expected to give personal contributions to the study process, their personal background, ideas, thoughts, opinions are interesting and important for everyone in EU universities.

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International workshop on "Strategic Management" in Poznan, Poland

International workshop on "Strategic Management" in Poznan, Poland

With Toshniyoz Goziev, Ms Kanai Csilla and Dr. Henrietta Nagy. Szent Istvan University, 26.06.2015.

4 Benefits Research Reports

Name Abzal Abdramanov

Position	PhD student
Home University	Kazakh national agrarian university, Kazakhstan
Host University	SUA in Nitra, Slovakia
Mobility type and date	PhD (CASIA) - 22 months 2014-2017
Host Professor	Professor Peter Massanyi
E-mail	abdramanov.abzal@gmail.com

Activities during the mobility: The big opportunity from one of the most prestigious, elitist and respected projects like CASIA, was my chance to enrich and continue my knowledge and professionally outgrowth, thereby, contribute to the development of my research and the strengthening of the values of studies, experiments and my professional skills.

My stay in SUA Nitra was full of academic and scientific experiences again. I was very glad to come to this University and again enrich my skills. From the beginning I had good relationship with the staff of University. I was immediately involved into the New Laboratory called AgroBiotech research centre in the Laboratory of Molecular Toxicology and Andrology. AGROBIOTECH is a research centre which focuses on applied research in Agronomy, biotechnology and technology in agriculture, food and bioenergy. My position was a practitioner in this lab.

The regional competence centre for applied research and development in Nitra integrates leading applied research through the partnership of three institutions: Slovak University of Agriculture, University of Constantine the Philosopher and the Institute of Plant Genetics and Biotechnology of Slovak Academy of Sciences in Nitra. AGROBIOTECH research center is equipped with sophisticated research infrastructures, which allows conducting research at international level.

This time I totally moved to another direction of my speciality in the Laboratory of Molecular Toxicology and Andrology. We create a small project about how Plant extracts, especially Sambucus Nigra affect to Bull sperm quality.

First thing is which I studied to practice CASA analyses. Progressive motility is a vital functional characteristic of ejaculated human spermatozoa that governs their ability to penetrate into, and migrate through, both cervical mucus and the oocyte vestments, and ultimately fertilize the oocyte. A detailed protocol, based on the most common computer-aided sperm analysis (CASA) system with phase contrast microscope optics, is provided for performing reliable assessments of sperm movement pattern characteristics ("kinematics") in semen. The protocol can also be used with washed sperm suspensions where, in addition, the percentages of motile and progressively motile spermatozoa can also be derived. Using CASA technology it is also possible to identify biologically, and hence clinically, important subpopulations of spermatozoa (e.g., those in semen with good mucus-penetrating characteristics, or those showing hyperactivation when incubated under capacitating conditions) by applying multi-parametric definitions on a cell-by-cell basis.

Second thing is which I studied to practice ROS generation. ROS production in each fraction was assessed by the chemiluminescence assay using luminol (5-amino-2, 3- dihydro-1, 4-phthalazinedione; Sigma-Aldrich) as the probe. The test samples consisted of luminol (10 µL, 5 mmol/L) and 400 µL of control or experimental sample. Negative controls were prepared by replacing the sperm suspension with 400 µL of each culture medium. Positive controls included 400 µL of each medium, 10 µL luminol and 50 µL hydrogen peroxide (30 %; 8.8 M; Sigma-Aldrich).

Chemiluminescence was measured on 48-well plates in 15 1 min-cycles using the Glomax Multi+ Combined Spectro-Fluoro Luminometer.

The third thing was method Quantification of the superoxide production (NBT test) The nitroblue-tetrazolium (NBT) test was used to quantify the intracellular formation of the superoxide radical, by assessing blue NBT formazan deposits, generated by the reduction of the membrane permeable, yellow-colored, nitroblue tetrazolium chloride (2,20-bis (4-Nitrophenyl)-5,50-diphenyl-3,30-(3,30-dimethoxy-4,40-diphenylene) ditetrazolium chloride; Sigma-Aldrich) by the superoxide radical. The NBT salt was dissolved in PBS containing 1.5 % DMSO (dimethyl sulfoxide, Sigma-Aldrich) to a final concentration of 1 mg/mL and added to the cells (100 µL per well). After a 1 h incubation (shaker, 37 °C, 95 % air atmosphere, 5 % CO2), the cells were washed twice with PBS and centrifuged at 300 × g for 10 min. Lastly, the cells and formazan crystals were dissolved in 2mol/L KOH (potassium hydroxide; Centralchem) in DMSO. Optical density was determined at a wavelength of 620 nm against 570 nm as reference by a Multiskan FC microplate photometer (Thermo Fisher Scientific Inc.). Data are expressed in percentage of the SC Control (Control 1) set to 100 %.

The forth thing was The MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) tetrazolium reduction assay was the first homogeneous cell viability assay developed for a 96-well format that was suitable for high throughput screening. The MTT tetrazolium assay technology has been widely adopted and remains popular in academic labs as evidenced by thousands of published articles. The MTT substrate is prepared in a physiologically balanced solution, added to cells in culture, usually at a final concentration of 0.2 - 0.5mg/ml, and incubated for 1 to 4 hours. The quantity of formazan (presumably directly proportional to the number of viable cells) is measured by recording changes in absorbance at 570 nm using a plate reading spectrophotometer. A reference wavelength of 630 nm is sometimes used, but not necessary for most assay conditions.

At this time, I am preparing my scientific paper to participate in 12th International Conference, which is being held under the auspices of Minister of Agriculture and Rural Development of the Slovak Republic, of the Slovak Academy of Agricultural Sciences and in cooperation with AgroBioTech Research Centre in May 16 - 18, 2017.

This period of my stay, with the big team of Central Asian students and with the student organization ESN SUA Nitra we organized our traditional event Nation-to-Nation for the second time for International students and staff of SUA in Nitra, where we shared with our culture, traditions, cuisine and introduced for the wide public of international people “The Central ASIAN” countries. These goals are improvement of youth well-being, involvement of young people into social life, finding and promotion of young leaders. It is very important for me, which is why I strive to take part in this educational establishment together with progressive international youth.

During my study I was involved into the scientific projects of Animal physiology department. Where I was a part of big team with my supervisor prof. Peter Massanyi. I have learned to use in my research new machines and equipment, which was so enjoyable and useful for me. As well as, I have right now two certificates, which are proving my practical skills in science and pedagogy.

Organizing the "Erasmus Village" event where the incoming Erasmus Students present their universities to the Slovak students that want to study abroad was one of the wonderful events for me, because at this time together with ESN members and foreign students from Uzbekistan, Tajikistan, Spain, Turkey, Netherlands, Germany, Latvia, France, Belgium, Russia, Japan we shared about interesting information not only about our country also about our Universities. And the best exhibition stand was Our – Kazakhstan stand. Also together with Kazakh embassy in Bratislava we organized Charity Christmas market (Pic-3.)

And like a bonus of this program, I will get my certificates and letter of Thanks from AgroBiotech research centre and from ESN SUA Team.

Together with professor Gulmira Nurmanbekova we learnt the experience of SAU as a research university:

- How they developed the basics of research;
- Ensuring the interaction of science with educational process;
- Formation of information based on basic research in order to improve the educational process;
- Scientific infrastructure of university;
- methods of creation of conditions for increasing the prestige of the study and basic sciences.

Additionally, I had a short term courses in Utrecht University in the Institute of Risk Assessments. Also, from The Embassy of Kazakhstan in the Czech Republic and Slovak Republic I have also Letter of Thanks for the assistance and help for the preparation of 25 anniversary of the Independence of Kazakhstan.

I have already done much for improvement of my studies, science and social life. Nevertheless, this will be not enough for me. I still have many things to do. I aimed to join in researching and developing of my skills together with the best scientists, professors and academics in Agriculture and Food safety sciences, student activists, friends and colleagues, in order to create myself as a professional person, not only in studies, as well as challenges of my view for the mankind, to be social and to develop my community, myself like a human. Of course, I will prove that all of those things, goals and challenges gave me this CASIA project.

In conclusion, I would like to say that I am eager to gain new experiences, to continue to improve my skills and broaden my developing furthermore both my personal and professional experience by interacting and continuing in this project. Honestly, I can realize all my plans and my scientific work. I am persuaded that continue of my studying and prolongation in this program would contribute to my development as a specialist of international level in the best possible way.

Results of my study and the fruitful cooperation with my colleagues, we have got some interesting results which have been published on scientific Journals:

1. Eva Tvrdá, Eva Tusimová, Anton Kovácika, Dusan Paál, Hana Greifováa, **Abzal Abdramanov**, Norbert Lukác/ Curcumin has protective and antioxidant properties on bull spermatozoa subjected to induced oxidative stress//Animal Reproduction Science. An International Journal/ ISSN: 0378-4320/ Volume 172, September 2016, Pages 10-20// http://dx.doi.org/10.1016/j.anireprosci.2016.06.008

2. **Abzal Abdramanov**, Sarsembayeva N., Ussenbayev A., Eva Tvrdá, Jakhongir Alimov.//The in vitro effect of elderberry (Sambucus nigra) extract on the activity and oxidative profile of bovine spermatozoa//Journal of microbiology, biotechnology and food sciences 6(6):1319-1322. June 2017.2.

Key words: *CASIA*, SUA, AgroBiotech, analysis

Name	Akmal M. Asrorov
Affiliation	PhD candidate, Institute of Bioorganic chemistry, UZ
Mobility type and date	Doctorate, 01-10-2014 – 05-11-2015 CASIA
Host University	Slovak University of Agriculture, SK
Host Professor	Zdenka Galova
E-mail	akmal84a@gmail.com

Activities during the mobility: My main activity was conducting a research on *in-silico* study chitinases of cotton genome and of effects of insecticide sumi-alfa on cotton leaf soluble proteins. The results were published in two articles:

- Akmal Asrorov, Ildiko Matusikova, Uchkun Ishimov, Jamolitdin Ziyavitdinov, Olga Veshkurova, Shavkat Salikhov. Comparative Analysis of Free Amino Acids and Nitrogen in Cotton Leaves Treated with Different Classes' Insecticides. Agricultural Research (Springer). 2015, 3:277–282
- Akmal Asrorov, Ildiko Matušikova, Surayyo Dalimova, Zdenka Galova, Elvira Sultanova, Olga Veshkurova, Shavkat Salikhov. Agrochemicals Affect the Antioxidative Defense Potential of Cotton Plants. Journal of Microbiology Biotechnology and Food Sciences. 2016: 5 (6) 505-508).
- Akmal M. Asrorov, Ildikó Matušíková, Zdenka Gálová, Zuzana Gregorová, Patrik Mészáros, Surayyo Dalimova, Shavkat Salikhov. The Family of Chitinases in Cotton *G. raimondii*. Journal of Microbiology Biotechnology and Food Sciences. 2017: 6(6) 1284-1289.

During the mobility I've participated in 2 conferences:

- IX. vedeckej konferencie doktorandov. Nitra, Slovakia (2015)
- Agrobiodiversity for Improve The Nutrition, Health and Quality of Life, The scientific proceedings of the international network AgroBio*Net* Agrobiodiversity for improving nutrition, health and life quality. Nitra, Slovakia. 2015.

During the mobility period I've established cooperation with colleagues from Institute of Plant Genetics and Biotechnology (Nitra, Slovakia) and in cooperation we published one article. Further we established contact with colleagues from other departments of that institute. Still we are in close contact and currently working together on the next article.

During my mobility I intensely followed the scientific approaches carried by University teachers and colleagues from Research Institute:

- in-silico analysing genes/proteins and combing correlations in relations to biotic/abiotic stress factors
- mapping soluble proteins
- studying/identifying proteins isoforms defining their functions
- improving writing scientific paper skills
- brain training

Obtained benefit from mobility: The main benefits were discussing the topic I was around, leading to people who were interested in it, carrying experiments which were impossible in my Home Institute, gathering collected material into scientific papers which were accepted by and published in journals included in Scopus. I was able to have contacts for further cooperation.

Contribution to the Uzbekistan: The research results that I obtained can be considered to be very useful for Uzbekistan and CASIA project. As a result of researches carried together with European partners we were able to find the reasons how cotton plant leaves become more suitable place for sucking pests such as cotton aphid and spider mite, after treatment with sumi-alfa insecticide which is efficiently used against cotton bollworm, one of main economic pests in cotton.
My research was jointly supervised by Uzbek and Slovak supervisors. Regular on-line meetings between us can cause Uzbek and Slovak supervisors to strengthen scientific cooperation between Uzbekistan and Slovak universities.

Scientific part:
Application of insecticides is often associated with secondary biotic stress. Increased populations of aphids in cotton fields, treated with pyrethroid are of them. Rapid increase in aphid populations after cypermethrin, was determined that was unlikely due to direct stimulation of aphid reproduction. Besides it was linked with the applications of other pyrethroid insecticides: cypermethrin and deltamethrin. Similar observations have been made for different agrochemicals (mainly pyrethroids) applied on cotton. It has been suggested that some agrochemicals might alter the biochemistry of the treated plants. We established that pyrethroid insecticide sumi-alfa causes peroxidase and polyphenoloxidase activities to lower twice in plant leaves while carbophos (phosphorus organic compound) and lannate (carbamate) did not bring negative results. These changes in the system determining oxidative defensive role did not correlate with cysteine and methionine playing a significant role as reducing agents.

The next possible reason for the increased number of sucking pests is considered to be elevated quantity of free amino acids. They are among metabolites serving as food niche for both types of sucking and chewing pests together with their diverse functions. We established that sum of total free amino acids do not differ much in leaves treated with sumi-alfa preparation, comparing to control. But the total concentration of free essential amino acids significantly increases after treatment. We also determined that the nor changes in total free amino acids, neither elevations in essential amino acids correlate with the changes of total nitrogen in cotton leaves.

Breeding stress-tolerant and high-yield cotton exploit chitinases together with other defensive proteins Elevated activities of chitinases and other defense-related proteins resulted in reduced population of aphids in cotton, and their inhibition by insecticide treatment resulted in the population growth of spider mites both in greenhouse and field experiments. On the other hand, chitinases in cotton are believed to play a role in fiber development. From this point of view, we analyzed cotton *G. raimondii* genome/proteome for chitinases using *in-silico* analyses and found similarities in genes/proteins. As a result for the first time the structural map chitinases of cotton were generated. Signal peptides, carbohydrate (chitin) binding domains, Hinge regions, possible isoelectric points were predicted. These results will serve as fundamental knowledge to develop insect-resistant cotton lines.

Further we studied that a new isoform of RuBisCo (ribulose bisphosphate carboxylase) is formed in cotton leaves treated by sumi-alfa, resulting in isolation some sequences of amino acids, is formed, CO_2 fixation in treated cotton leaves increases. The expression of enzymes – elongation factor and fructose-bisphosphate aldolase increases in cotton plant leaves, treated with sumi-alfa. We identified the elevated expression of some isoforms determining their partial amino acid sequences. Our former results showed increased quantity of soluble proteins. Researchers carried out by the support of CASIA revealed the reason that it was linked with the higher expression elongation factor which catalyzes the binding of aminoacyl-tRNA to the A-site of the ribosome. Besides, we defined the reason of increased amount sugars expected to be main food source for sucking pests develop on the basis elevated fixation of CO_2.

Key words: cotton aphid, spider mite, insecticide, sumi-alfa, chitinase

Name	Umida BALTAEVA
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Mobility type and date	Post Doctorate (TIMUR) 01/11/2014-31/08/2015
Host University	Georg-August Universitat Göttingen, Germany
Host Professor	Professor Ingo Witt
E-mail	umida_baltayeva@mail.com

Activities during the mobility: During my mobility I have been involved to the research activities of the research group Professor Ingo Witt. Such as results, we prepared two papers on the theme "Boundary value problems for a third-order loaded differential and integro-differential equations mixed type" under supervisor Professor Ingo Witt

Obtained benefit from mobility: The present mobility gave me the opportunity to establish new collaborators and study comparatively new recent research directions in my field of research. The TIMUR Erasmus Mundus mobility Program had helped me to begin use effectively the expertise of scientists and to improve my skills by participating in international research activities. My research experience at the Georg-August-Universitat Göttingen will be very inspiring, productive and highly rewarding.

Contribution to the Uzbekistan: Due to this research collaboration, I have learned new differential and integro-differential operators. Consequently, was able to apply this knowledge on my recent results with our students. Moreover, Collaboration with organizations (such as CWM, EWM and OWSD) and international specialist women in science help me to make strong relation between Europe and Uzbek women mathematicians.

Scientific part:

BOUNDARY VALUE PROBLEMS FOR A THIRD-ORDER LOADED DIFFERENTIAL AND INTEGRO-DIFFERENTIAL EQUATIONS MIXED TYPE

The theory of mixed type equations is one of the principal parts of the general theory of partial differential equations. The interest for these kinds of equations arises intensively due to both theoretical and practical uses of their applications. The first fundamental results in this direction were obtained in 1923 by F. Tricomi. The works of S. Gellerstedt, M.A. Lavrent'ev, A.V. Bitsadze, F.I. Frankl, M. Protter and C. Morawetz, M.S. Salakhitdinov, T.D. Djuraev, J.M. Rassias have had a great impact in this theory, where outstanding theoretical results were obtained and pointed out important practical values.

Currently, the concept of mixed-type equations has expanded to include all possible combinations of two or three classic types of equations.

A systematic study of the third and higher order mixed and mixed-composite type PDEs, containing in the main part parabolic-hyperbolic, hyperbolic-elliptic and elliptic-parabolic operators began in the early seventies and intensively developed by many mathematicians.

In the recent years, in connection with intensive research on problems of optimal control of the agro economical system, long-term forecasting and regulating the level of ground waters and soil moisture, it has become necessary to investigate a new class of equations called as "loaded equations"[10].

For example, wave string, loaded discrete mass point problems, which find wide application in physics and techniques, can be reduced to the loaded differential equations. We, as well, note that solution

[10] **U.I. Baltaeva** Solvability of the analogs of the problem Tricomi for the mixed type loaded equations with parabolic-hyperbolic operators // Boundary Value Problems, Volume:211, p.1-12 (**2014**).

many problems optimal control agro ecosystems for example, problems long-term forecasting and regulating the level of ground waters and soil moisture reduces to the investigation of particular cases of the integro-differential equations.

Basic questions of the theory of boundary value problems for PDEs are the same for the boundary value problems for the loaded differential equations. However, the existence of the loaded operator M does not always make it possible to apply directly the known theory of boundary value problems for PDEs.

On the other hand, searching for solutions of loaded differential equation pre-assigned classes it might reduce to new problems for non-loaded equations.

In our investigations we investigated main boundary value problems such as the Tricomi, Darboux, Gellerstedt problems and their generalizations, and well-posed new boundary value problems for the linear loaded integro-differential equations of the third order, with the classic and parabolic-hyperbolic operators.

Name	Yuliya Borissova – Kolesnichenko
Affiliation	Kazakh National Agrarian University, KZ
Mobility type and date	Doctorate, 2012-2016, 23 months CASIA
Host university	Czech University of Life Sciences in Prague, CZ
Host Professor	Oto Nakladal
E-mail	yuliyakaznau2015@gmail.com

Activities during the mobility: My main activity was conducting a research on Saproxylic Beetles of the main tree species in the tugai forests of Kazakhstan. The results were published in three articles:

- Kolesnichenko, Y.S., Nakladal, O., Akramov, M.B. & Sartbayev, Zh.T. (2014) Study of Saproxylic Beetles of some tree species in the tugai forests of the Ili River. Research, Results of Kazakh National Agrarian University, 2 (062), 147–151.
- Baňař P., Štys P. & Kolesnichenko Yu. (2015) A new species of the genus Alienates Barber (Hemiptera: Heteroptera: Enicocephalidae: Alienatinae) from Venezuela. Zootaxa, 4012 (2), 391–395. IF 0.906.
- Nakládal O., Novák V., Kolesnichenko Yu. (2017) Research on Alleculinae (Coleoptera: Tenebrionidae: Alleculinae) in tugai forests of the Almaty region in Kazakhstan using window traps. Turkish Journal of Zoology, 41, 178 – 180. IF 0.88.

During the mobility, I have participated in several conferences:

- Conference "Zoo Days", Ostrava, Czech Republic (2014).
- International Scientific-Practical Conference "Current Status of Biodiversity of the State Nature National Park of Charyn and Neighboring territory", devoted to the 10th anniversary of the Charyn SNNP, Almaty, Kazakhstan (2014).
- VII Congress on Plant Protection "Integrated Plant Protection – a Knowledge-Based Step towards Sustainable Agriculture, Forestry and Landscape Architecture", Zlatibor, Serbia (2014).

During the mobility period, together with my supervisor Oto Nakladal, I participated in lectures and seminars on General and Systematic Entomology for Erasmus students. We established contacts with colleagues from the Faculty of Forestry and Wood Science and currently have the Agreement for Erasmus+ Credit Mobility for 2016-2018.

In the first year of my mobility, I intensely followed short courses especially tailored for PhD's. Among them:

- General Entomology,
- Systematic Entomology,
- General Phytopathology,
- Integrated Forest Protection,
- Game Management,
- Applied Statistics.

Obtained benefit from mobility: The main benefit was that I defended my PhD thesis (Forest pathological state and conservation measures of tugai forests in Kazakhstan part of the Ile River basin) at KazNAU and received the PhD degree. In addition, I received the experience of working in one of the world leading university in the field of agriculture and forestry. I definitely improved my scientific skills, obtained an experience in scientific writing and publishing in peer reviewed journals. Made significant contacts for a future cooperation. I have opened new prospects, received opportunities for scientific and study activity. I began to understand issues of the forest science more clearly and find ways for their solving.

Contribution to Kazakhstan: The research problem – protection of the tugai forests – extremely urgent in Kazakhstan, therefore any result obtained are useful for forestry of Kazakhstan. In the published papers, affiliation of Kazakh National Agrarian University is present, which contribute to a

positive publicity of the institute and its position in the international rankings. The collaboration between KazNAU and CULS became more strong and continued in Erasmus + Credit Mobility.

I had joint supervision for my PhD thesis. My supervisor from CULS Assos.Prof. Oto Nakladal visited Kazakhstan several times and supported the field research. We organized the group with participation of KazNAU supervisor Prof. Sabit Baizakov and master's students of Forest Resources and Silviculture specialty for providing research in the tugai forests. This lead to a future cooperation between universities.

Scientific part:

Saproxylic beetles of the some tree species in the Kazakhstan tugai forests of the Ile River floodplain

Tugai forests are the riparian forests along the rivers in the continental, winter-cold deserts of Central Asia. They are unique island plant communities, the origin and life of which is closely associated with the activities of peculiar rivers. The tugai forests grow along watersides of the Southern rivers of Kazakhstan: Syrdarya, Chu, Ili, Karatal. Tugai forests of the Ili River usually have a complicated structure. The main tree species of the tugai forests are *Elaeagnus angustifolia*, *Populus diversifolia, Populus pruinosa* and *Fraxinus sogdiana*.

The tugai forests have a large agricultural and economic significance: they protect against soil erosion, water evaporation, and they strengthen the banks of the rivers. They often play an agricultural field-protection role against wind or snow, for example, and realize bio drainage in slump bottomland regions.

The tugai forests are characterized by specific fauna of saproxylic beetles. These beetles are the main component of the present fauna and are of special importance for biodiversity conservation in the tugai forests. Therefore, data about the saproxylic beetles in the tugai forests of Kazakhstan are described in this review.

The aim of the research was to study the composition and structure of the Saproxylic beetles fauna in the main tree species of the tugai forests near the Ili River - *Populus diversifolia* and *Fraxinus sogdiana*.

Methods included using the window traps for catching beetles. The universal window trap is served for catching of insect, which migrate in the air, and this trap is effective for all the directions of the migration.

There were 4 localities in the tugai forests: 2 localities of Poplar and 2 - of Ash. There were chosen 20 trees of Poplar and 20 trees of Ash in each locality. Total number of trees and window traps was 80 pieces. For each tree were measured its parameters and the environmental parameters. The samples were collected once in 2 weeks. The collected material was sorted in the laboratory conditions.

All insects were divided to Orders and Beetles - to Families. Orders Coleoptera and Hemiptera: Heteroptera have the highest number of specimens for *Fraxinus sogdiana*. For *Populus diversifolia* Orders Hymenoptera: Formicidae and Coleoptera have the highest number of specimens. There were 49 families of Coleoptera. There are Curculionidae for both tree species and Anobiidae in *Fraxinus sogdiana* as well as Melyridae in *Populus diversifolia* have the highest number of specimens.

Key words: tugai forests, saproxylic beetles, Coleoptera, trees and shrubs; forest pests

Name	Anna Bronzes
Affiliation	Environmental engineer, GM Powertrain Uzbekistan
Mobility type & date	Doctorate mobility (TIMUR) 29/12/2016-31/01/2018
Host university	Wageningen University, Netherlands
Host Professor	Rik Leemans, Lars Hein
E-mail	anna.bronzes@wur.nl

Activities during the mobility: During my mobility, I have conducted my research at Environmental System Analysis (ESA) Group at Wageningen University and Research (WUR). Under the supervision of three leading professors, Rik Leemans (WUR), Lars Hein (WUR) and Alim Pulatov (Tashkent Institute of Irrigation and Agricultural Mechanization Engineers), I have developed my PhD Project Proposal to research values of ecosystem services in Uzbekistan.

To increase my scientific potential, I took a course SENSE Writing Week, where I have obtained a useful knowledge and learned how to write scientific papers. This course prepared me to publish my articles.

Obtained benefit from mobility: The mobility has provided a chance to meet new important people and establish collaboration in my research field. Through this collaboration, I have increased my experience and knowledge about new valuation concepts for ecosystem services. This experience raises my confidence to continue working on innovative ideas for environmental protection.

Also, this mobility provided me an opportunity to present my country and share Uzbek culture and traditions with other staff and PhD students. It`s a pleasure to know that people are interested in your country and even start to consider it as a new `potential environmental science research market`. Some international students are planning to conduct their internships in Uzbekistan. This is a new youth bridge between East and West for research collaboration and I am proud to be a part of it.

Contribution to the Uzbekistan: My proposed research project is significant for Uzbekistan because it focuses on an important problem as the growing demand for information about ecosystems and their linkages to economic and other human activities. This demand is tried to be fulfilled by a new framework, called SEEA-Experimental Ecosystem Accounting (SEEA-EEA). Even though the SEEA-Experimental Ecosystem Accounting is not an international standard yet, however, the United Nations Statistical Commission encourages other countries to test and experiment with ecosystem accounting approach. To promote the accounting approach and to test its capability and relevance in a new region, current research will come up as a pioneer project in Uzbekistan.

Meanwhile, for the local perspective, this study aims to assess ecosystem services values and review possibilities to improve ecosystem management in the overexploited Ugam-Chatkal State National Nature Park. Addressing the aim, the research will: fill significant gaps in use of accounting and welfare-based approaches, which are still deeply undiscovered; explore critical barrier to assess non-use values; observe the dynamics of ecosystem services and communities' incentives change with future perspectives; have ability to promote concept of SEEA-EEA to support decision-making in Uzbek environmental policy. And finally, this study will be a starting point to develop an idea about considering Natural Capital in Uzbekistan GDP.

Scientific part:

VALUATING ECOSYSTEM SERVICES TO SUPPORT ENVIRONMENTAL MANAGEMENT OF THE UGAM-CHATKAL STATE NATIONAL NATURE PARK IN UZBEKISTAN

Scientific summary of research

Over the last decades, assessing ecosystem services (ESs) has gained increased attention because ecosystems are stressed and this restrains their current and future services supply. This questions how the supply and demand of ESs can be better balanced to enhance their sustainable use. Ecosystem services can be managed through market mechanisms. This offer opportunities to calculate their values and maybe establish a proper price. However, capturing these opportunities requires to clarify how valuable or beneficial ecosystems and their services are. This is addressed in this study, which explicitly aims to assess the ecosystem services' values and benefits in the Ugam-Chatkal State National Nature Park (UCHSNNP) of Uzbekistan. The assessment's methodology includes ecosystem accounting and a welfare-based approach for use values, and choice experiments for possible non-use values. Further, to understand park`s values and their development, the communities' incentives and their dynamics of change will be reviewed, involving scenario analysis. Contributing to better manage the park's ecosystems, this study finally reviews possibilities to integrate ecosystem-accounting systems into Uzbek's environmental policy by appraising examples from other countries, such as the Netherlands.

Name	Konstantin Ivushkin
Affiliation	Tashkent Institute of Irrigation and Melioration, UZ
Mobility type and date	Doctorate, 29-12-2014 – 24-12-2017 TIMUR
Host university	Wageningen University & Research, NL
Host Professor	Arnold Bregt
E-mail	k.ivushkin@gmail.com

Activities during the mobility: My main activity was conducting a research focused around development of a method for soil salinity monitoring using remote sensing. The results were published in two articles:

- Ivushkin, K., Bartholomeus, H., Bregt, A. K., Pulatov, A. (2017) Satellite Thermography for Soil Salinity Assessment of Cropped Areas in Uzbekistan. Land Degrad. Develop., 28: 870–877. doi: 10.1002/ldr.2670.
- Ivushkin, K., Bartholomeus, H., Bregt, A. K., Pulatov, A., Bui, E.N., Wilford, J. (2018) Soil salinity assessment through satellite thermography for different irrigated and rainfed crops. International Journal of Applied Earth Observation and Geoinformation, 68: 230-237. doi: 10.1016/j.jag.2018.02.004.
- Ivushkin, K., Bartholomeus, H., Bregt, A. K., Pulatov, A., Franceschini, M., van Loo, E.N., Kramer, H., Finkers, R. (2018) UAV based soil salinity assessment. In preparation for a special issue of Geoderma journal.

During the mobility I've participated in several conferences:

- 37th Asian Conference on Remote Sensing, Colombo, Sri Lanka (2016)
- EGU General Assembly, Vienna, Austria (2017)
- Pedometrics 2017, Wageningen, the Netherlands (2017)
- Nederlands Centrum voor Geodesie en Geo-informatica Symposium, Enschede, Delft (2016, 2017).

During the mobility period I've established cooperation with colleagues from Australia and one of the articles we wrote together. Further we established contact with colleagues from plant science department and currently working together on the next article.

In the first year of my mobility I intensely followed short courses especially tailored for PhD's. Among them:

- Spatial sampling for mapping
- Land Dynamics, getting to the bottom of Mount Kenya
- Global Soil Information Facilities
- PhD competence assessment
- Brain Training

And been a member of discussion groups:

- Remote Sensing discussion group
- Landscape Dynamics discussion group
- AgroFood Robotics discussion group

Obtained benefit from mobility: The main benefit is the experience of working in one of the world leading university in the field of agriculture and food research. I definitely improved my scientific skills, obtained an experience in scientific writing and publishing in peer reviewed journals. Made valuable contacts for a future cooperation.

Contribution to the Uzbekistan: The research problem – soil salinity – extremely severe in Uzbekistan, therefore any result obtained are useful for agriculture industry of Uzbekistan. In the published papers affiliation of Tashkent institute of irrigation and agricultural mechanization Engineers

is present, which contribute to a positive publicity of the institute and its position in the international rankings.

My research was jointly supervised by Uzbek and Dutch supervisor. Regular skype meetings between all of us help to strengthen ties between Uzbek and Dutch supervisor which can lead to a future cooperation between universities.

Scientific part:

Satellite and UAV thermography for soil salinity assessment
Increased soil salinity is a significant agricultural problem that decreases yields for common agricultural crops. It is quite dynamic in time which makes timely soil salinity data crucial point in agricultural management. Remote sensing can provide necessary spatial and temporal resolution, but widely acknowledged methods and techniques for soil salinity monitoring using remote sensing are not present yet.

The canopy temperature change is one of the stress indicators in plants. Its behavior in response to salt stress on individual plant level is well studied, but its potential for landscape or field scale studies is not investigated yet. In our study, possibilities of satellite and UAV thermography for landscape and field scale soil salinity assessment were studied. The performance of satellite thermography is compared with other approaches, like Normalized Difference Vegetation Index (NDVI), Enhanced Vegetation Index (EVI), Optimized Soil Adjusted Vegetation Index (OSAVI) and Physiological Reflectance Index (PRI). The study areas were located in Uzbekistan, Australia, and the Netherlands. The diversity of the study areas allowed us to analyze behavior of canopy temperature of different crops (wheat, cotton, barley, quinoa) grown in different conditions (rainfed and irrigated). MODIS and Landsat TM multiannual satellite images and UAV images were used. ANOVA was used to analyze relations between the soil salinity and canopy temperature and other remote sensing variables. Time series graphs were created to analyze the dynamics of the process.

The results showed significant correlations between the soil salinity and canopy temperature on all study areas. The amplitude of canopy temperature difference between salinity classes varies for different crops, but the trend of temperature increase under increased soil salinity is present in all cases. Moreover, most widely used vegetation indices showed to be not useful for monitoring in case of salt tolerant plants like quinoa, because of the green biomass increase in response to soil salinity. The visual comparison of the soil salinity map and the canopy temperature map show similar spatial patterns. The strongest relation between the soil salinity and canopy temperature was usually observed at the end of a dry season and in the period of maximum crop development.

Satellite thermography appeared to be a valuable approach to detect soil salinity under agricultural crops both at landscape and field scale.

Key words: soil salinity, thermography, landsat, modis, UAV, vegetation indices

Name	Erkinjon Karimov
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Mobility type and date	Academic Staff mobility (TIMUR) 06/06/2015-31/07/2015
Host university	University of Las-Palmas de Gran Canaria
Host Professor	Professor Kishin Sadarangani
E-mail	erkinjon@gmail.com

Activities during the mobility: During my mobility I have been involved to the research activities of the research group headed by Professor K. Sadarangani. As a result, we prepared 2 papers and shared ideas on next collaboration. Together with research group members, we analysed teaching programs and other activities of the ULPGC comparing with NUUz and other universities.

Obtained benefit from mobility: The present mobility gave me the opportunity to establish new collaborators and study comparatively new recent research directions in my field of research. Obtain new experience on constructing teaching programs in an international level and teaching students with different majors, including engineering, economics etc. I enjoyed with the nature of Gran Canaria and learned culture of local people, obtained new personal relations with Spanish professors.

Contribution to the Uzbekistan: Due to this research collaboration, I have learned nonlinear differential equations. Consequently, was able to apply this knowledge on my recent results with my students. Moreover, using existing relation, my colleagues also established new research collaborations and continuing to make strong relation between Spanish and Uzbek mathematicians.

Scientific part:

ON A METHOD OF REDUCTION OF FRACTIONAL ORDER DIFFERENTIAL EQUATION TO THE INTEGER ORDER DIFFERENTIAL EQUATION.

In this short note, I would like to describe a new approach on reduction fractional differential equations (DEs) to the integer order DEs. Result was obtained in the joint work[11] with Professor K.Sadarangani with whom I started scientific collaboration during my visit to ULPGC and developed in the recent work[12] with my Uzbek student.

In the work[13] by M. Caputo and M. Fabrizio the following fractional operator with non-singular kernel was introduced

$$ {}_{CF}D^{\alpha}_{at} f(t) = \frac{1}{1-\alpha}\int_a^t f'(s) e^{-\frac{\alpha}{1-\alpha}(t-s)} ds, \qquad (1) $$

where $0 < \alpha < 1$.

Domain of the operator (1) is

$$ W^{\alpha,1}(a,\infty) = \left\{ f(t) \in L^1(a,\infty); \left(f(t) - f_a(s)\right) e^{-\frac{\alpha}{1-\alpha}(t-s)} \in L^1(a,t) \times L^1(a,\infty) \right\} $$

[11] **N. Al-Salti, E. Karimov, K. Sadarangani**. On a Differential Equation with Caputo-Fabrizio Fractional Derivative of Order 1 <b<2 and Application to Mass-Spring-Damper System, Progr. Fract. Differ. Appl., 2, 257-263 (**2016**).

[12] **Erkinjon Karimov, Sardor Pirnafasov.** Higher order multi-term time-fractional partial differential equations involving Caputo-Fabrizio derivative. Electronic Journal of Differential Equations, No 243, 1-11 (**2017**).

[13] **M. Caputo, M. Fabrizio**. A new definition of fractional derivative without singular kernel, Progr. Frac. Differ. Appl. 1, **2015**, 1-13.

with the norm

$$\| f(t) \|_{W^{\alpha,1}} = \int_a^{\infty} | f(t) | dt + \frac{\alpha}{1-\alpha} \int_{a-\infty}^{\infty} \int^{t} | f_a(s) | e^{-\frac{\alpha}{1-\alpha}(t-s)} dsdt,$$

where f_a продолжение функции $f(t)$, i.e.

$$f_a(t) = f(t), t \geq a, \quad f_a(t) = 0, -\infty < t < a.$$

Higher order drivatives of order $(n+\alpha)\,(n \geq 1)$ is defined as follows

$${}_{CF} D_{at}^{(n+\alpha)} f(t) = {}_{CF} D_{at}^{\alpha} \left({}_{CF} D_{at}^{n} f(t) \right).$$

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Name	Khurshid Aliev
Affiliation	Turin Politechnic University in Tashkent, UZ
Mobility type and date	DOCTORATE, 07/07/14 – 07/07/17 TIMUR
Host University	Politecnico di Torino. IT
Supervisor	Prof. Eros Pasero
E-mail	khurshid.aliev@polito.it

Activities during the mobility: During the mobility at the Politecnico di Torino the research was conducted on the Internet of Things Applications and Artificial Neural Networks in Smart Agriculture. I also carried out 60 CST courses related to my research field and Italian language course. Moreover, 1 Journal paper and 1 Book chapter and 2 conference papers were published:

Journal Papers

J1. **Aliev Kh.,** Rugiano F., Pasero E., Smartphone and Bluetooth Smart Sensor Usage in IoT Applications, Sensors & Transducers, Vol. 201, Issue 6, June 2016, pp. 27-34, URL: http://www.sensorsportal.com/HTML/DIGEST/june_2016/Vol_201/P_2828.pdf

Book chapter

B1. **Kh., Aliev,** S., Narejo, E., Pasero and J., Inoyatkhodjaev, A Predictive Model of Artificial Neural Network for Fuel Consumption in Engine Control System, Multidisciplinary Approaches to Neural Computing, Vol. 69, pp. 213-222, 2018, ISBN:978-3-319-56903-, DOI: 10.1007/978-3-319-56904-8_21,

Conference Papers

C1. Khurshid Aliev, Francesco Rugiano, and Eros Pasero, April 24, 2016, The Use of Bluetooth Low Energy Smart Sensor for Mobile Devices Yields an Efficient Level of Power Consumption, ALLSENSORS 2016 : The First International Conference on Advances in Sensors, Actuators, Metering and Sensing, Veinice, Italy, URL http://www.thinkmind.org/index.php?view=article&articleid=allsensors_2016_2_20_70042

C2. Kh., Aliev, S., Narejo, E., Pasero and J., Inoyatkhodjaev, 2016, A Predictive Model of Artificial Neural Network for Fuel Consumption in Engine Control System, 26th Italian Workshop on Neural Networks May 18-20, Vietri sul Mare, Salerno, Italy.

Status of my PhD thesis: The final discussion to obtain PhD degree has been on 09 January 2018. Final defence has been conducted under 5 commission members: Prof. Alippi Cesare, Referee, Politecnico di Milano Prof. Cirrincione Giansalvo, Referee, Université de Picardie Jules Verne Amines Prof. Morabito Francesco, Universita Mediterranea di Reggio Calabria Prof. Vitabile Salvatore, University of Palermo Prof. Martina Maurizio, Politecnico di Torino and members voted positively. The PhD degree has been obtained in Electronics Engineering under supervision Prof. Pasero Eros and co-supervisor Dr. Alim Pulatov.

Obtained benefit from mobility: The mobility gave me enormously great chance to get European PhD degree in Electronics. The financial and organizational support by TIMUR project members and facilities (laboratories, lecture rooms and offices) at Politecnico di Torino was main sources for my successfully obtained PhD degree. Additionally, all obtained scientific skills, experiences in scientific writings could play inestimable role in expanding my future career.

Contribution to the Uzbekistan: One of the greatest contribution of the mobility is obtained PhD degree. Since Uzbek universities need qualified engineers. Moreover, it has been established co-tutoring agreement between Politecnico di torino (SCUDO) and Tashkent Institute of Irrigation and Millioration, with Dr. Alim Pulatov. Conducted research could be great source to develop smart

agriculture applications and implementation of WSN (Wireless sensor networks) in agriculture fields of Uzbekistan.

Scientific part:

Internet of Things Applications and Artificial Neural Networks in Smart Agriculture
Internet of Things (IoT) is receiving a great attention due to its potential strength and ability to be integrated into any complex systems and it is becoming a great tool to acquire data from particular environment to the cloud. Data that are acquired from Wireless Sensor Nodes(WSN) could be predicted using Artificial Neural Network(ANN) models. One of the use case fields of IoT is smart agriculture and there are still issues on developing low cost and power efficient WSN using advanced radio technologies for short and long-range applications and implementation of prediction tools. This is the reason why the target of this thesis is to develop a low cost and power efficient WSN and IoT based control system and analyze the best predictive model for such systems. With this purpose, we developed BLESensor node for short-range IoT applications and Internet of Plant(IoP) for long distance smart agriculture applications. A non-linear prediction model is developed in order to forecast acquired data from sensor nodes.

BLESensor - node Experimental test results reveal that newly developed BLESensor node has a good impact on the improved lifetime and applications could possibly make this emerging technological area more useful. The Android software has been tested on Samsung Galaxy SM-T311, running Android 4.4.2 and it works without any issues and it is supposed to work on all other Android devices equipped with BLE. The working temperature range of the BLESensor node is supposed to work goes from -20 °C to 70 °C due to battery temperature limits. The system has been tested in the climatic chamber (Challenge 250 from Angelantoni) present at the Neuronica Lab, which allowed the sensor to be software calibrated. Several measurements have been proven that each node offers an uncertainty of 1.2 °C for temperature. These values are acceptable for the type of application for which they are intended. The power consumption has been measured directly from scope analysis and simulating the code stepby step and calculations resulted that the lifetime of the node lasts for a month. Considering a normal use of these sensors with a reasonable sampling time the lifetime could be increased.

IoP node - IoP node is a prototype device that works with WiFi protocol and collects temperature, humidity and soil moisture data of plants to the cloud. For IoP node, we have implemented a firmware, tested a prototype device and designed the PCB in OrCAD software and generated a Gerber file and developed an android application.

Prediction model Comparison of three non-linear models with Oak data set resulted in better performance of NNARX model and we used NNARX model to predict 10 days' step ahead maximumandminimumtemperatureanddescribedtheresultsofperformances. The performance given by trained models in terms of Mean Square Error (MSE) for maximum temperature prediction provided an error of 0.8826 on unseen data for the month of September. Similarly, the performance of model predicting minimum temperature was tested and it resulted in an error value of 0.944.

In conclusion, this work must be intended only as a proof-of-concept, although, the developed BLESensor system, IoP prototype device and predictive models showed expected optimum results, both in terms of functionalities and usability.

Key words: Internet of Things, Artificial Neural Networks, Wireless Sensor Networks, Smart Agriculture.

Name	Makhkamov Trobjon
Position	Head of the department «Botany and physiology of plants»
Home University	National University of Uzbekistan
Host University	Adam Mickiewicz University in Poznan
Mobility type and date	Post-Doctarate (TIMUR) 31/12/2016-31/06/2017
Host Professor	Professor Julian Chmiel
E-mail	mturobzhon@mail.ru

Activities during the mobility: During my mobility in Poland I studied the programs TURBOVEG and JUICE for the creation of an electronic database of phytocenological studies. I took part in scientific expeditions to study ruderal flora of the Polish Republic, I collected the materials for comparative analysis with ruderal flora of Uzbekistan and prepared scientific articles on the basis of their analysis. I studied the structural composition, scientific directions of the departments, curricula and educational process of the Biological Faculty of the University Adam Mickiewicz in Poznan. I participated in the leading lecturers of the department "Plant taxonomy" and exchanged experience with lecturesrs.

Obtained benefit from mobility: I achieved enrichment with scientific data of the comparative part of my doctoral dissertation on the topic "Ruderal Flora and Ruderal Community of Uzbekistan". I have many friends and scientific partners from many countries around the world. I was honored to see the unique and beautiful cities of Europe. All of the above works were carried out thanks to my participation in the Erasmus Mundus program grant. I express my gratitude to all the leaders and staff of the grant who worked diligently and conscientiously in the framework of this grant and I wish that the number of such programs increased.

Contribution to the Uzbekistan: Mainly, this mobility allowed me to strengthen the work of the innovative project on the topic "Creation of an experimental plantation of plants Crocus sativus L. and Colchicum autumnale L." № IOT-2017-5-15. Seeds of over 20 species of trees and shrubs were brought from Poland. Seeds of these trees and shrubs will serve to enrich the flora of Uzbekistan with new 15 species of plants.

The results obtained and their novelty: For the first time was conducted full detailed inventory of ruderal flora of the Fergana Valley and her analysis. Characteristics of ruderal flora and ruderal vegetation of this large industrial region were founded out. For the first time in Fergana Valley was made ecological-floristic classification (prodromus) of ruderal vegetation which was made in accordance with main principles of the Braun – Blanquet school.

Practical value: The information about ruderal vegetationn may be used by the creation of State reports about conditions of environment of the Republic of Uzbekistan. The work results may be used by the compilation of new regional summaries for vascular plants. The findings may be the basis for the monitoring of urban flora of this region. Herbarium material (more than 300 pages) essentially supplemented funds of Central Herbarium Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan, and may be used for the further researches.

Name	Mamadalieva Nilufar
Position	Senior scientific researcher
Home University	Institute of the Chemistry of Plant Substances, Uzbekistan
Host University	BOKU University, Austria
Mobility type and date	Post-Doctorate (TIMUR) 1st stay: 2.11.2016-30.01.2016; 2nd stay: 3.04.2017-31.10.2017
Host Professor	Professor Thomas Rosenau
E-mail	nmamadalieva@yahoo.com

Activities during the mobility: I consider my mobility stay to BOKU through the Erasmus Mundus TIMUR program as an extremely valuable experience in my scientific career. My research focused on evaluating the phytochemical composition of the plants from Lamiaceae family. We have already published one paper in SCI journal, and another one has been accepted:

1. N.Z. Mamadalieva, N.S. Abdullaeva, T. Rosenau, M. Fakhrutdinova, S.S. Azimova, S. Böhmdorfer. (2018): Composition of essential oils from four Apiaceae and Asteraceae species growing in Uzbekistan. *Natural Product Research*. (Taylor & Francis), 32(9), 1118-1122.
2. N.Z. Mamadalieva, O.T. Turginov, T. Rosenau, M. Fakhrutdinova, S.S. Azimova, K.S. Tojiboev, S. Böhmdorfer. (2018): Essential oil composition of *Dionysia hissarica*. Chemistry of Natural Compounds. (Springer), 54(4), xxx-xxx. (in press).

As the results of my work and the successful collaboration, we have got some interesting results which have been discussed at the 3 International Conferences:

1. N.Z. Mamadalieva, S. Böhmdorfer, D.Kh. Akramov, M. Bacher, A. Akhmedov, M. Fakhrutdinova, S.S. Azimova, T. Rosenau. HPTLC fingerprint profiles of six *Lagochilus* species from Uzbekistan. International Symposium for High Performance Thin Layer Chromatography. 4-8th July 2017, Berlin (Germany).
2. N.Z. Mamadalieva, S. Böhmdorfer, A.A. Janibekov, M. Bacher, M. Fakhrutdinova, S.S. Azimova, T. Rosenau. Secondary metabolites of *Astragalus* species growing in Uzbekistan. Conference on the 65th Anniversary of Faculty of Pharmacy, Comenius University in Bratislava - 46th EuroCongress on Drug Synthesis and Analysis (CFPH2017), 5-8th September, 2017, Bratislava (Slovakia).
3. N.Z. Mamadalieva, D. Kh. Akramov, S. Böhmdorfer, M. Bacher, M. Fakhrutdinova, S.S. Azimova, T. Rosenau. Phytochemical characterization and antimicrobial activity of the species *Lagochilus* (Lamiaceae). 3rd International Conference on Natural Products Utilization: from Plants to Pharmacy Shelf (ICNPU-2017), 18-21th October 2017, Bansko (Bulgaria).

I attended in the Group meetings, seminars and lectures. Together with Austrian collegues, we visited biggest paper making factory Norsk Skog (Bruck under Mur), Lenzing Textile Company (Lenzing) and old silver mining Arzberg. These trips were extremely informative, very interesting and useful for me. I attended 2 times in "International Days" organized by Erasmus Mundus office ZIB, BOKU.

Obtained benefit from mobility: The research visit provided the following outcomes: we could identify of volatile compounds obtained from the selected plants by chromatographic (GC and GC-MS) methods. I improved my skills in new advanced chromatographic (such as HPTLC and GC-MS) and analytical techniques (1D and 2D NMR spectroscopy). We used novel approaches to isolate and identify molecules from plants (TLC, flash chromatography). This grant helped me enter more deeply into the plant chemistry research that I have specialized in and gave me the opportunity to form new research collaborations.

Contribution to the Uzbekistan: Experiences achieved in host University greatly help me in better organizing my work at my home Institute. I think this will be my chance to transfer the benefits of knowledge to my home institution. In the regular Skype meetings between BOKU and National

University of Uzbekistan, we discussed how to improve our collaboration and develop partnerships. Both Universities confirm to establish long-term and mutually beneficial cooperation in the area of exchange of visiting academic staff; exchange of master and doctoral students; organization and carrying out the scientific, scientific-practical, educational and methodical conferences and seminars; publication of scientific and academic literature, exchange of publications, etc.

The results obtained and their novelty: For the first time were identified volatile compounds of the species *Dionysia hissarica, Heracleum lehmannianum, Prangos pabularia, Pseudohandelia umbellifera* and *Pulicaria salviifolia* from Uzbekistan Flora by using GC and GC-MS methods. Using modern chromatography techniques the major secondary metabolites of the genus *Phlomis* and *Lagochilus* were isolated and quantified. The chemical structures of isolated individual compounds were performed by using accurate mass-, UV-Vis-NIR, FT-IR, high resolution 1D and 2D NMR spectroscopy. *In situ* biological potential of the extracts and compounds evaluated by TLC bioautographic methods.

Practical value: The flora of Uzbekistan is a rich source of perspective plant sources which can be useful as a source of novel chemical structures. The outcomes of our investigations resulted new compounds (high value phytochemicals) which can be tested further for their bioactivity. Our obtained data on the chemical investigations of Uzbek medicinal plants will be added to the database which will be useful for further successful investigations in this direction. The training in advanced methods in chromatography and various analytical experiments enhanced my knowledge, skills and expertise, and will be utilized to develop research activities in my institute. In practical terms, I will help my home institute by bringing new ideas and techniques to start new projects or to take existing projects in new directions.

Scientific part: HPTLC method for the quantification of Lamiide in *Phlomis* species

A number of *Phlomis* (Lamiaceae) species revealed various pharmacological activities such as antioxidant, antimicrobial, immunosuppressive, anti-mutagenic, anti-cancer, anti-diabetic and anti-inflammatory effects. Phytochemical studies of the chemical components of *Phlomis* have led to the identification of monoterpenoids, sesquiterpenoids, diterpenoids, triterpenoids, triterpene saponins, 2-phenylethanoid and benzyl glycosides, lignans, flavonoids, essential oils, phenolics, organic and fatty acids etc. *Phlomis* species have been previously shown to contain lamiide and recognized as a perspective source of iridoids.

High-Performance Thin-Layer Chromatography (HPTLC) is a simple, flexible and cost efficient method for quantitative analysis. Analysis can be performed easily in a short time and requires a small amount of the sample. From the literature survey and to our best knowledge no previous report is available for determination and quantification of lamiide in *Phlomis* species using HPTLC. The aim of the work was to develop a simple, rapid, selective and cost effective HPTLC method for the determination and quantification of lamiide in 5 *Phlomis* species. Quantitative analysis of lamiide in 5 *Phlomis* species was performed by densitometric scanning at 235 nm. Results of HPTLC analysis showed that the content of lamiide ranged from 0.56-3.63 mg/g (dry mass) in 5 species of *Phlomis.*

Key words: *Phlomis*, HPTLC, lamiide, quantification

Name	Mirzokhid Mirshadiev
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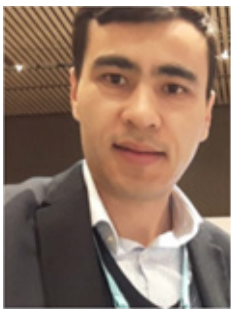
Mobility type & date	PhD mobility (TIMUR) 11/06/2015-01/31/2018
Host university	Wageningen University and Research, NL
Host Professor	Professor Coen Ritsema
E-mail	mirzokhidmirshadiev@gmail.com



Activities during the mobility: During my mobility in Wageningen University, I have been involved to the research activities of the research group "Soil Physics and Land Management" headed by Professor C. Ritsema (promoter), with (Supervisors) Dr. L. Fleskens and Dr. J. Van Dam. As well as, together with collaborating Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (TIIAME), EcoGIS center, (supervisors) Dr. A. Pulatov. My PhD research the topic "Improving water productivity in arid and semi-arid zone of Uzbekistan".

Over the time from November 2015 to 2018 January, I have been attended to the several conferences like: Poster presentation - ELLS conference in Prague, Czech Republic (2015), Agriwat conference in Wageningen University, The Netherlands (2016), European Geoscience Union Conference in Vienna, Austria (2017), American Geophysical Union in New Orleans, USA (2017);

Moreover, I have been participated in many different symposiums and workshops, winter schools: like to mention a few : "Soil Contamination and it is effects" In Wageningen University (2017), "Water Scarcity" Amsterdam Frij University in Amsterdam (2017), "EIT Food Entrepreneurship" winter school held on Technical University of Munich, Germany and Cambridge University, UK, (2017). I have been honored to participate as Uzbekistan delegate at the prestigious conference "Harvard Project for Asia and International Relations" in the Harvard University, USA (2018).

As a result, we prepared and submitted 1 scientific paper to the international journal, following with several poster and oral presentations in the international conferences.

Obtained benefit from mobility: The present mobility gave me the opportunity to establish new collaborators and study comparatively new recent research directions in my field of research. I gained a lot from scientific perspectives and personal development. I have broadened my vision and improve my knowledge and skill from international perspective.

Contribution to the Uzbekistan: Due to this research collaboration, I have been doing research on improving water productivity in arid and semi-arid zone of Uzbekistan. This research study contributes to development of new approach for better management of water and land resources in Uzbekistan, as well as can be implemented somewhere else with similar environmental conditions.

Consequently, using existing relation over 10 years between Wageningen University and TIIAME, my colleagues continuing to make strong relation between the Netherland and Uzbek professors.

Scientific part:

Land and water use practices intended to increase water productivity in arid and semi-arid zones. Application to Uzbekistan.
Study result was obtained in the joint work[14] with Dr. Luuk Fleskens, Jos Van Dam and Alim Pulatov with whom I started scientific collaboration during my PhD mobility in Wageningen University, the Netherlands.

[14] **M. Mirshadiev, L. Fleskens, J. van Dam and A. Pulatov**. Land and water use practices intended to increase water productivity in arid and semi-arid zones. Application to Uzbekistan. 19th EGU General Assembly, EGU2017, proceedings from the conference held 23-28 April, **2017** in Vienna, Austria., p.9339. Link: http://adsabs.harvard.edu/abs/2017EGUGA.19.9339M

Water demand increases as more food is required to meet population growth and higher living standards. In addition, climate change is expected to further exacerbate water scarcity in already dry areas where irrigation is most needed. In the water scarce areas, the key strategy to meet demand of growing food production and water use is increase of water productivity (WP) based on best land and water use practices. A literature review will be conducted to study promising land and water use practices that increase water productivity in arid and semi-arid zones, with a special focus on Uzbekistan.

In addition to literature review we will conduct interviews with local farmers and land and water management experts. However, due to time constraints and difficult to access grey literature, the review paper cannot cover all promising land and water use practices that have been used in Uzbekistan. We selected the following promising practices: a) conventional furrow irrigation; b) deficit irrigation; c) drip/sprinkle irrigation, and d) rain-fed with supplemental irrigation.

The preliminary findings of the literature review show that in Uzbekistan in case of conventional furrow irrigation the WP range of cotton was 0.32-0.89, and of wheat 0.44-1.77 (kg m3). By applying deficit irrigation practices, WP values of cotton can be 0-25% higher (0.32-1.11 kg m3), and of wheat 114-400% higher (2.20-3.78 kg m3). However, deficit irrigation practices for potato's need to be managed carefully to reach higher WP, and might even negatively affect WP, showing a range of 0.85-7.04 compared to conventional furrow irrigation 4.02-4.81 (kg m3). Important to mention that drip irrigation practice can highly contribute to increase WP of cotton by 156-91 % (0.82-1.70 kg m3) compared to furrow irrigation. Also, rain-fed cultivation with supplemental irrigation result is anticipated and will be included in the presentation and full version of paper. In summary, the review of current land and water use practices shows promising increases of WP values for cotton, wheat and potato crops in case of Uzbekistan.

Name	Omarova Akkenzhe
Home university	Kazakh National Agrarian University
Mobility type & date	CASIA III, Doctorate Duration – 13 months 31.01.2015-31.02.2017
Host university	Czech University of Life Sciences Prague (CULS Institute of Animal Physiology and Genetics, Academy of Sciences of the Czech Republic.
Host Professor	Professor Rada Vojtech Head of the Department of Microbiology, Nutrition and Dietetics Faculty of Agrobiology Food and Natural resources

Activities during the mobility: My time in Prague was certainly of great worth to me both in terms of developing valuable skills for career purposes and developing as personal skills. I made new International friends and time by time we became very close friends. I highly recommend students Erasmus Mundus program as it is the greatest opportunity for everyone. I really appreciate and realize the benefits of being able to participate in this project. Because the Erasmus Mundus CASIA project had a positive impact on my career and taught me to see and think about the world in a broad. Moreover, I am confident that my experience in Prague was extremely exciting, fun, and valuable for both my studies and overall general development.

The most important results of my mobility were my experiments in the laboratory of anaerobic microorganisms, Institute of Animal Physiology and Genetics, Academy of Sciences of the Czech Republic (Vídeňská 1083, Prague 4-Krč 14 200, Czech Republic). I have done part of plans of my PhD dissertation in this laboratory and department of Microbiology, Nutrition and Dietetics. Also, I got good results with strains which we isolated at this department from Kazakh national drinks, such as kumiss and shubat. Results of this research were published and presented at the International Masaryk Conference for PhD students and young researchers 2016 (Dec 12, 2016 – Dec 16, 2016).

Obtained benefit from mobility: Being in the Czech Republic under the CASIA III project, I can say with certainty that I have acquired the best experience in my entire life. My supervisor, the head of the Department of Microbiology, Nutrition and Dietetics, Faculty of Agrobiology Food and Natural resources professor Rada Vojtech. In January with the PhD students Ing. Jiří Killer, Ph.D. and Chahrazed Mekadim, under the supervising of professor Vojtech, we started research in the laboratory of anaerobic microorganisms, Institute of Animal Physiology and Genetics, Academy of Sciences of the Czech Republic, Vídeňská 1083, Prague 4-Krč 14 200, Czech Republic

During the whole training process, I studied the following courses: 1) English for Academic Purposes Advanced 2) Milk and dairy products 3) Food Quality and Food Safety 4) Food beverages and Additives 5) Global Food security 6) Czech language. I have passed 5 exams with Excellent and 1 exam with mark Good.

Contribution to the Kazakhstan: I feel a considerable progress in my own experience and I can observe the evolution of my ideas over time. With experience in biological research, documentation, teaching/instruction and clinical laboratory environments, I took generate perfect results. I will devote a part of life to the development of the Biotechnology in my country. As well-trained researcher I want to lead a group of researchers in the future. With this skill, knowledge and experiences I can do more than an ordinary scientist.

Very strongly, I want to seize the chance which is given me by the developed science of the Czech Republic. I hope that my qualification will be in great demand in the future of my country, where I will try to use the experience gained abroad.

Scientific part: Subject of my research at the Laboratory of Anaerobic Microbiology (LAM, Institute of Animal Physiology and Genetics, Czech Academy of Sciences Prague) was focused on amplification

and sequencing of newly proposed phylogenetic, identification markers usable in phylogenetic studies and identification of members within the bacterial order Lactobacillales. In addition, the other title of my research at LAM were aimed at amplification and sequencing of new phylogenetic and identification markers designed for other taxonomic group of bacteria's (genera *Bifidobacterium*, *Actinomyces, Propionibacterium*) and ecological studies of bifidobacteria occurring in unexplored ecological niches, such as digestive tract of wild pigs, bumblebees etc.

Besides theoretical knowledge, I have learned and applied various laboratory techniques such as DNA extraction, PCR-based methods, DNA sequencing, DNA purification, DGGE method, DNA sequence analysis, protein purification, TGGE electrophoresis and spectrophotometry, array-CGH and other genetic researches during my study at the university as well as during my working period in laboratory of Genetics and Physiology of animals.

Name	Ravshan Eshonkulov
Affiliation	Karshi Engineering Economic Institute, UZ
Mobility type and date	Doctorate, 29-08-2014 – 29-07-2017 TIMUR
Host university	Hohenheim University, DE
Host Professor	Professor Thilo Streck
E-mail	ravshan_ecogis@yahoo.com

Activities during the mobility: My main activity was conducting a research focused around determining energy imbalance of eddy covariance (EC) measurements. The results were published in two articles:

- Eshonkulov, R., Poyda, A., Ingwersen, J., Pulatov, A., Streck, T. (2018). An attempt to improve the measured surface energy balance closure over a winter wheat field in southwest Germany: Accounting for minor storage and flux terms. Submitted to the Journal: Agriculture and Forest Meteorology. Under review.

- Eshonkulov, R., Poyda, A., Ingwersen, J., Wizemann H.D., Pulatov, A., Streck, T. (2018). Long-term observations of energy balance closure over agricultural crops in two regional climates of Southwest Germany. (In preparation for the Journal Biogeosciences).

During the mobility I've participated in several conferences:

- EGU General Assembly, Vienna, Austria (2016)
- EGU General Assembly, Vienna, Austria (2018) (Planned in April)

Scientific part:

Long-term observations of energy balance closure (EBC) over agricultural crops in two regional climates of Southwest Germany

The energy balance of eddy covariance measurements (EC) is typically not closed. This is a main challenge for the evaluation of EC measurements. In our study, EC measurements were conducted in two different climatic regions (Kraichgau and Swabian Jura) in Southwest Germany at a total of six sites from 2010 to 2016. From this dataset, the year 2015 was selected for a detailed analysis of the energy balance closure (EBC). To examine potentially uncaptured eddy motions due to loss of low and/or high-frequency, we applied different time averaging intervals, ogive analyses and cospectrum analyses to the data set. The standard Bowen ratio (BR) was compared with the alternative buoyancy flux ratio approach to understand near-surface secondary circulations. Moreover, statistical analyses were conducted for the whole data set to test the effects of year, site and crop on EBC. The annual mean EBC over all seven years and six sites ranged from 57 to 88% and was significantly affected by the site. First results of the spectral analyses indicate that most of missing turbulent energy can be attributed to the sensible heat flux. We show that the contribution of low frequency loss to the energy gap of EC measurements can be appropriately estimated when minor energy storage and flux terms are considered in addition to the correction for high frequency losses.

Key words: Energy balance closure, eddy covariance technique, agricultural crop, turbulent fluxes, footprint

Name	Galibjon Sharipov
Affiliation	Tashkent Automobile and Road Institute, UZ
Mobility type and date	Doctorate, 07.2014 – 07.2017 TIMUR
Host University	University of Hohenheim, DE
Supervisor	Hans. W Griepentrog
E-mail	shgolibm@gmail.com

Activities during the mobility: A research focused on modelling and optimisation of a no-till seeding machine performance, in terms of seeding depth variation control was carried out. The conducted research resulted in the following accomplished research papers:

Journal Papers

J1. **Sharipov, G.M**., Paraforos, D.S., Pulatov, A., Griepentrog, H.W., 2017b. Dynamic performance of a no-till seeding assembly. Biosyst. Eng. 158, 64–75. doi:10.1016/j.biosystemseng.2017.03.016

J2. **Sharipov, G.M**., Paraforos, D.S., Griepentrog, H.W., 2017a. Modelling and simulation of the dynamic performance of a no-till seeding assembly with a semi-active damper. Comput. Electron. Agric. 139, 187–197. doi:10.1016/j.compag.2017.05.010

J3. **Sharipov, G.M**., Paraforos, D.S., Griepentrog, H.W., 2017. Implementation of a magnetorheological damper on a no-till seeding assembly for optimising seeding depth. Comput. Electron. Agric. (*Submitted*)

J4. Paraforos, D.S., Reutemann, M., **Sharipov, G**., Werner, R., Griepentrog, H.W., 2017. Total station data assessment using an industrial robotic arm for dynamic 3D in-field positioning with sub-centimetre accuracy. Comput. Electron. Agric. doi:10.1016/j.compag.2017.03.009

Conference Papers

C1. **Sharipov, G**., Paraforos, D., Griepentrog, H.W., 2016. Modelling and optimization of a no-till direct seeding machine, in: Lecture Notes in Informatics (LNI), Proceedings - Series of the Gesellschaft Fur Informatik (GI). Osnabrück, pp. 193–196.

C2. **Sharipov, G**., Paraforos, D.S., Griepentrog, H.W., 2017. Modelling and simulation of a no-till seeder vertical motion dynamics for precise seeding depth, in: Advances in Animal Biosciences. Cambridge University Press, pp. 455–460. doi:10.1017/S2040470017000590

C3. **Sharipov, G.M**., Paraforos, D.S., Griepentrog, H.W., Gall, C., 2017. Defining the dynamic performance of a no-till seeder by measuring the geo-referenced seeding depth, in: 75th International Conference on Agriculture Engineering: LAND.TECHNIK AgEng 2017. pp. 329–335.

C4. Reiser, D., Vázquez-Arellano, M., Izard, M.G., Paraforos, D.S., **Sharipov, G**., Griepentrog, H.W., 2017. Clustering of Laser Scanner Perception Points of Maize Plants. Adv. Anim. Biosci. 8, 204–209. doi:10.1017/S204047001700111X

Status of my PhD thesis: The aim of the research was to optimise a no-till seeder dynamics in terms of vertical motion stability for better seed placements under realistic high capacity performance. In order to fulfil this aim, the PhD thesis is constructed based on three journal and one conference paper from the afore-given papers. Currently, the PhD thesis is ***under review*** and editing of my supervisor and fellow post-doc colleagues.

Obtained benefit from mobility: The mobility provided me an opportunity to start and subsequently develop my academic career, and shape my experience of working in the field of agriculture engineering. My obtained scientific skills, experience in scientific writing and publishing could play

inestimable role in expanding my further career. Valuable contacts made from attended conferences and scientific events, and collaborations with companies can make a future cooperation easy.

Contribution to the Uzbekistan: The conservation agriculture (CA) has been tested and partially implemented into agriculture of Uzbekistan. The problem in achieving consistency of seeding depth in no-till one of the essential parts of CA has defined from the early experiment conducted in Uzbekistan, therefore any result obtained from this research makes an asset for the implementation of no-till seeding into agriculture of Uzbekistan. In addition, the first published journal paper was conducted cooperating with Tashkent institute of irrigation and agricultural mechanization engineers, which contribute to a positive publicity of the institute and its position in the international rankings.

Scientific part:

Modelling and optimization of a no-till seeder

No tillage or no-till seeding, as an essential aspect of conservation farming that has been gaining the greatest interest of farmers, is a soil cultivation system in which seeds are deposited directly into untilled soil. In no-till seeding, a proper seeding depth is a very important factor that affects seed germination and seedling emergence. As the deeper the seed, the more energy the seed requires reaching the covered soil surface and, thus delays emergence. Conversely, the shallow depth causes less water content for seeds to germinate. Both ultimately reduce yields. Therefore, maintaining a consistent seeding depth is one of the most demanding task that no-till seeders must cope with. This task is very challenging due to many reasons:

- Untilled soils are more compacted, in terms of surface undulations and soil hardness, than tilled soils and therefore this causes less cushioning and more bouncing effect in a vertical movement of seeding assembly, especially at higher operation speed.
- The harder soils require greater downforce to keep the seeding assembly on the ground for target seeding depth. However, the excessive downforce results in higher variation in seeding depth due to variations in hard soil resistance.
- Existence of crop residues and stubble on untilled soil surface increases the difficulty in achieving a desired response of the seeding assembly to the untilled soil surface.

For addressing these problems, mainly three journal papers were accomplished. In paper J1, the developed sensor-frame for measuring the seeder dynamics together with the corresponding field surface profile and the new methodology for acquiring seed positions in absolute geo-referenced coordinates were represented. In this paper, the frequency content of the seeder dynamics and seeding depth variation was correlated to define the reason of the extreme variations in seeding depth. The mathematical modelling and real-measured data based simulation of the vertical motion dynamics of the no-till seeding assembly with the packer wheel as a passive system and with the semi-active magnetorheological (MR) damper system were presented in paper J2. This paper also evaluated the improvements of the seeder dynamics resulting in better seed placements. In paper J3, no-till seeder prototype was constructed consisting of an automatic seed dose mechanism and two seeding assemblies with and without semi-active MR damper. An optimum parameters for the semi-active MR damper, which the seeding assembly achieves its best performance were defined and the performances of the seeder prototype as seeding depth variation and the dynamics of both seeding assemblies were evaluated.

Key words: Seeding machine dynamics, seeding depth variation, coulter assembly modification

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Mobility type and date	Doctorate (TIMUR) 19/07/2015 – 15/07/2017 and 01/10/2017-31/01/2018
Host university	Slovak University of Agriculture in Nitra, SK
Host Professor	Prof. Dr. Ing. Elena Horská
E-mail	hpirmatov@mail.ru

Activities during the mobility: I have conducted my research work and had courses related to the field of my studies. The research results were published in the following scientific articles:

- Pulatov, A., Pirmatov K., Horská, E. (2016) Adoption and Development of Conservation Agriculture in Europe. In Selected Issues of EU Agrarian Law EU VIII.: Current Issues of Rural Development and Legal Regulation. Nitra: Slovak University of Agriculture, p. 92-96.
- Pirmatov K., Pulatov, A., Horská, E. (2016) Comparative Analysis of Conventional and Conservation Agriculture. In The Agri-Food Value Chain: Challenges for Natural Resources Management and Society: International Scientific Days 2016, Nitra: Slovak University of Agriculture, p. 156-162. DOI:10.15414/isd2016.s2.07
- Horská, E., Pulatov, A., Pirmatov K. (2016) Conservation Agriculture as Sustainable Farming Practice. In the Scientific Journal "Acta Facultatis Technicae", Zvolen, Slovakia 21, 2 (2016), p. 29-36. ISSN 1336-4472.
- Pirmatov K., Horská, E., Pulatov, A. (2016) Advantages of Conservation Agriculture. In Young Researchers of Agro-Industrial and Forestry Complexes to Regions. Vologda State Milk Academy named after N.V.Vereshchagin, p. 14-21. ISBN 978-5-98076-210-0.
- Horská, E., Pirmatov K., Pulatov, A., Ubrežiová, I., Repiský J. (2016) Socio-Economic Impact of Value Added Agriculture on Rural Development". In ICABR 2016. Bangkok: Kasetsart University, p. 106-109. ISBN 978-616-278-346-3.
- Pirmatov K., Horská, E., Pulatov, A. (2017) Innovations as key drivers for the growth. In Managerial trends in the development of enterprises in globalization era: international scientific conference, Nitra: Slovak University of Agriculture, p. 883-887.

Obtained benefit from mobility: I have enhanced my knowledge and improved my academic skills. Moreover, I built up a network of professional contacts, with whom I can also exchange knowledge, ideas and opinions in the future after completing my mobility.

Contribution to the Uzbekistan: During my mobility, I have introduced the rich history, culture and tradition of my country abroad and organized the cultural event dedicated on our national holiday "Navruz" for International and Slovak audience. Coming back to Uzbekistan, I am going to share my knowledge and experience gained from Slovak University of Agriculture in Nitra with my colleagues, professors and students at my home university.

Scientific Part:

NEW APPROACH TO AGRICULTURAL PRACTICE

In 21st century, new technology and innovation in the different sectors of economy are supported by international organizations, states, research institutes, NGOs and investors in order to make our life much easier and more comfortable. Moreover, it is highly paid attention to the sustainability of each technology, which includes three features: economic, social and environmental values.

Nowadays, land degradation costs an estimated US$40 billion annually worldwide, without taking into account the hidden costs of increased fertilizer use, loss of biodiversity and loss of unique landscapes (FAO, 2016). One of the solutions to the following issue is to implement new approaches for growing crops – Conservational Agriculture (CA). Based on FAO explanation, CA has main three principles: minimum soil disturbance, permanent soil cover as well as crop rotation. While implementing CA technology, there are also other significant aspects, which need keeping under a careful control such

as residue, pest and weed managements. CA compared with conventional agriculture has more advantages except weeds (Table 1). However, weed and pest problems are obstacle especially at the beginning of CA adoption, with time the following problems can be overcome with herbicide and pesticide applications. Moreover, the crop rotation as the one of the main principles of CA is preventing crops from spreading different plant pests, which commonly appear in monoculture.

Table 1 *Comparison between Conventional and Conservational Agricultures*

No.	Issues	Conventional Agriculture	Conservation Agriculture
1.	Soil organic matter	Lower	More
2.	Soil biological health	Lower	More
3.	Soil temperature	More variable	Moderated
4.	Soil compaction	Increased	Reduced
5.	Infiltration	Lower	More
6.	Erosion	Maximum	Less
7.	Weeds	Lower	More
8.	Cost	More	Lower

Source: Author's development

CA works in a variety of agro-ecological zones and farming systems. It is getting more popular in South America, North America and Australia. Europe, Asia and Africa are considered as the potential continents for implementing this technology. The main economic advantages of CA are time saving and the cost reduction (labor, fuel, machinery operating and maintenance). It is also main drive for farmers, who depend on family labor. By implementing this technology farmers save 39% of working hours for mechanized operations and 59% working hours for land preparation activities with tractors.

With maintaining residue on a land surface, CA reduces soil erosion as well as provide higher infiltration. Secondly, CA is regarded as carbon sequestration, it has been calculated that the total potential for soil carbon sequestration by agriculture could offset about 40% of the estimated annual increase in CO_2 emissions[15]. Therefore, the implementation of this technology to the practice can lead to the reduction of carbon emission and slow down the process of climate change.

CA represents the seventh and eighth goals of the Millennium Development Goals by 2015, which is connected with ensuring environmental sustainable as well as building a global partnership for development. Promoting CA globally along with FAO, the European Conservation Agriculture Federation (ECAF), which was established in 1999 as a non-profit making international association, held the first World Congress on Conservation Agriculture in 2001 in Madrid, initiating a series of such congresses: 2003 Brazil, 2005 Kenya, 2009 India, 2011 Australia, 2014 Canada and 2017 Argentina. In order to popularize CA worldwide, there is need more international, regional and national supports as well as projects and grants for scientists, scholars, extension workers and farmers to study the various aspects of the technology.

Acknowledgements
It is very pleasure to express my gratitude to my supervisors Alim Pulatov and Elena Horská as well as Erasmus Mundus program TIMUR&CASIA project coordinators Ewa Wietsma, Norbert Floris, Loretta Schwarczova for presenting great an opportunity to carry out my research work at the Slovak University of Agriculture in Nitra. The above-mentioned scientific articles have been created within the project Erasmus Mundus Partnership, Action 2, TIMUR No. 545730-EM-1-2013-1-NL-ERA MUNDUS-EMA21.

[15] **Robbins, M.** Carbon trading, agriculture and poverty. Bangkok, Thailand. World Association of Soil and Water Conservation (WASWC). Special publication 2. 48 p. **(2004)**

5 Double Degree Master program students benefits

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ECOGIS CENTER - 15 YEARS IN EDUCATION, RESEARCH AND INNOVATION

WAGENINGEN UNIVERSITY & RESERCH

Double Degree Master Program between TIIAME and WUR

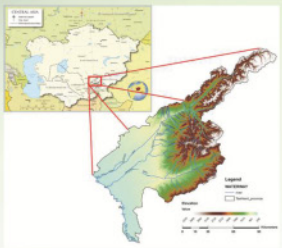
Name: Djakhangir Atakhanov
Type of degree: Master
Study period: 2011-2014
Host university: Wageningen University
Home university: Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

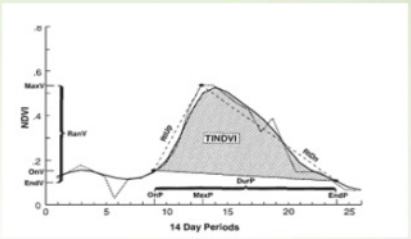
Thesis title: Crop yield forecasting in Tashkent province by using Remote Sensing techniques

Supervisors at host university: Associate proffesor, Jan Clevers

Research objective

- How can remote sensing prediction improve logistics of harvest in Tashkent province?
- How accurate is the Remote sensing prediction in comparison to ground truth data?
- Which of the variables in NDVI metrics is valuable to identify the growing season?





Conclusions:
The results obtained at the province level show a decrease of yield in 2013 to 0.2 c\ha. Model was validated by Leave-one-out cross-validation (LOOCV) procedure and the calculated RMSE for the model for Tashkent province level expresses a low value (RMSE=0.0340), which means that squared error is low and methods are accurately done. The best indicator was identified for the province level and for each administrative district level separately, subsequently the forecasting has been done for all research levels. Finally, the correlation between the ground truth data (historical data) and NDVI forecasting had been conducted and R2=0.55 which expresses, that there is good correlation. Results obtained from this research indicates, that alternative satellites and indicators have to be assessed and analyzed. The harvesting of the cotton, and time planning can be improved, as well as agricultural management in order to get better outcomes.

During my study at Wageningen University I have taken a lot of courses which gave me cognitive information and helpful knowledge for my research and skills. I would love to say that this University gave me opportunity to make one week of field work and get skills with remote sensing and geo information equipment.

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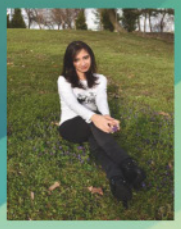
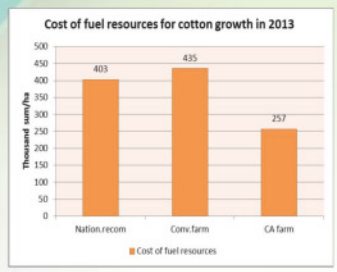


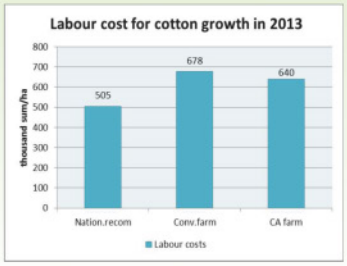
Name: Anna Bronzes
Type of degree: Master
Study period: 2012-2014
Host university: Wageningen University
Home university: Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

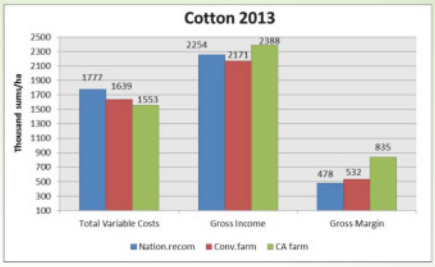
Thesis title: Social and economic aspects of application conservation agriculture technologies in Uzbekistan

Supervisor at host university: E.C. van Ierland

Research questions:
1. What are the costs and benefits of CA technology implementation for farmers and government compared to the traditional one?
2. What are the preferences of farmers to use agriculture technology and how does it fit to what the new technology can offer them?
3. What kind of stimulating rules of soil conservation in Uzbekistan exist for farmers and how effective are they as compared to the similar rules in other countries?







Conclusions:
1. Stimulating policy of soil conservation in both countries are different:
Uzbekistan: The goal is to decrease soil erosion processes. The Meliorative Fund plays a big role in land restoration activities.
USA: The goal is land conservation via state CA programs. The part of the budget of USDA and EPA is provided for implementation of CA for farmers.
2. None of the countries have penalty rules for farmers for soil quality decrease (regulations are presented via instructions). That`s why this sector is very vulnerable.
3. CA in Uzbekistan is not adopted as state program that is actually done in USA.
4. The land tax rate depends on quality of soil and as the quality is higher the tax rate is also increasing. Such "anti-stimulating" rule could be contradictive in future for CA technology adoption, as the technology is going to improve and increase soil quality. It can cause extra costs for farmers, which may be not willingly accepted.
5. There are incentives for farmers for water conservation (drip irrigation system), that make them free from land tax for 5 years, but there are no any incentives for soil conservation.
Current occupation: PhD candidate at Wageningen University

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Double Degree Master Program between TIIAME and WUR

Name: Sarvar Eltazarov
Type of degree: Master
Study period: 2013-2015
Host university: Wageningen University
Home university: Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

Thesis title: Soil salinity assessment in Syrdarya Province, Uzbekistan

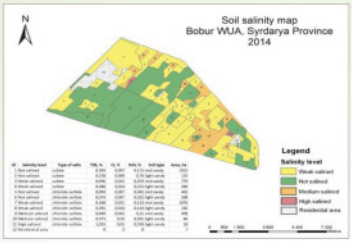
Supervisor at host university: Henk Ritzema, WUR, Andre Amstel, WUR

Research questions:

-What is the change of soil salinity over the period in study area?
-What is the effect of soil salinity level on crop yield in study area?
-Which of the GIS/RS indices gives the best results for soil salinity assessments in study area based on vegetation reflectance?

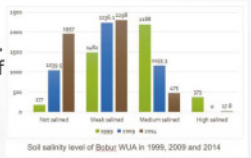
Conclusions:

This research has been conducted a study on change of soil salinity in Bobur WCA. The results of the study show that soil salinity situation has improved in the study area and leading to the positive changes over 1999 and 2014. According to the results, in the study area was a dramatic increase of not salined area, while the medium salined areas experienced a noticeable decline. To sum up results, it can be concluded that the areas with medium and high salinity level decreased and not saline and weak salined areas experienced territorial increase.



The results of study of applying GIS&RS indices in wheat cultivated areas (NDVI, NDSI and NDCI) shows significant correlations with the soil salinity characteristics when applied in Syrdarya Province, Uzbekistan. The highest coefficient of correlation and determination between GIS&RS indices and TDS value is observed between mean NDCI values of wheat in polygon and TDS value of polygon, which are R = -0.84 and R2 = 0.70. The correlation and determination analysis between mean NDSI values of wheat in polygon and Cl value of polygon, which are R = -0.90 and R2 = 0.82.

In general, soil salinity in study area has improved leading to the positive changes over the last decades. The reduce of crop yield according to soil salinity level identified and results shows significant effect of soil salinity on crop (wheat and cotton) yield.



Current occupation: Consultant, International Water Management Institute (Central Asian Office)

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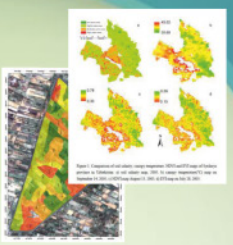
Double Degree Master Program between TIIAME and WUR

Name: Konstantin Ivushkin
Type of degree: Master
Study period: 2011-2014
Host university: Wageningen University
Home university: Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

Thesis title: Developing Integrated Methodology for Mapping Soil Salinity by GIS tools in Syrdarya province
Supervisor at host university: Harm Bartholomeus
Research questions:

Which of the existing remote sensing based models/indices gives the best results for soil salinity assessments on test sites in Syrdarya region based on vegetation and bare soil reflectance?

To what extent standard salinity map values, used in Uzbekistan, correlate with different salinity indices values?



Conclusions:

Results with vegetation reflectance analysis showed higher correlation. Best R values was achieved with COSRI index (-0.57) in dataset of secondary data. NDVI also showed significant correlation -0.53.

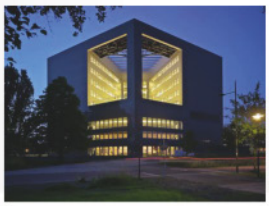
Dataset with the archive map (secondary data) performed almost as good as our data, R values was close in two datasets. Which means that data, which research organisation producing now and different governmental body using, can be imported into RS and GIS environment, for analysis, improving or validation of RS data

In conclusion there are more promising technique for soil salinity assessment by multispectral (like Landsat) RS is vegetation reflectance study. And this could be the direction for future research on soil salinity assessment by RS in Uzbekistan

Current occupation: PhD candidate at Wageningen University

Publications:

Ivushkin, K., Bartholomeus, H., Bregt, A. K., & Pulatov, A. (2017). Satellite Thermography for Soil Salinity Assessment of Cropped Areas in Uzbekistan. Land Degradation & Development, 28(3), 870-877.
Ivushkin, K., Bartholomeus, H., Bregt, A. K., Pulatov, A., Bui, E. N., & Wilford, J. (2017, April). Infrared thermal remote sensing for soil salinity assessment on landscape scale. In EGU General Assembly Conference Abstracts (Vol. 19, p. 11888).



During my stay at the Wageningen University I followed master program in Geo-Information. This program provided an opportunity to participate in many interesting courses. Moreover, as a part of the program we visit several companies which actively working in GI field. And during the last period we worked as a consultancy group for one of this organisation.

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University of Natural Resources and Life Sciences, Vienna

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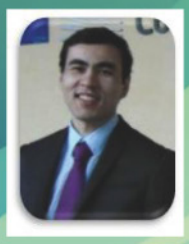
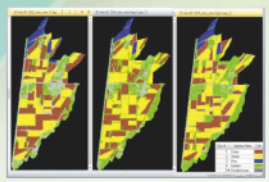


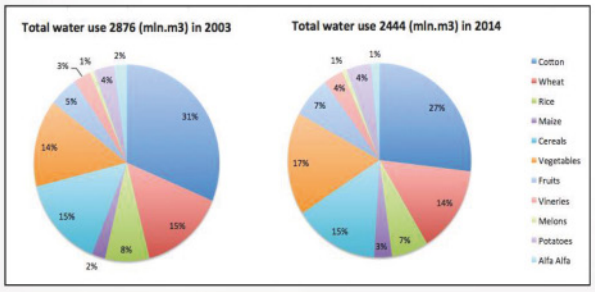
Name: Mirshodiev Mirzohid
Type of degree: Master
Study period: 2013-2015
Host university: Wageningen University
Home university: Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

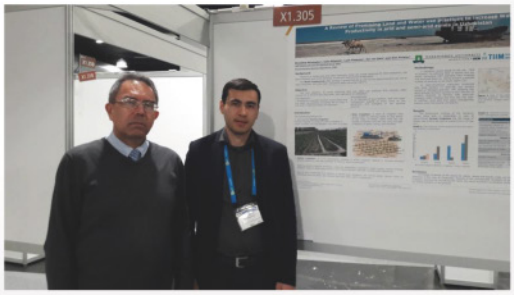
Thesis title: Land and Water use change assessment in Tashkent province, Uzbekistan.

Supervisor at host university: Dr. Luuk Fleskens (WUR), Dr. Jos van Dam (WUR)
Research questions:
1. What is the extent of land use change, in terms of cropland area and crop allocation over the last decade, in Tashkent province?
2. What is the extent of water use change, in terms of irrigation over the last decade, in Tashkent province?
3. What is the rate of water productivity over the last decade, in Tashkent province?



Conclusions:
Noticeable change in the cropland area, such as the gradual decrease of cotton monoculture from 23 % to 20% in Tashkent province in contrast to Urta Chirchiq district from 33,1% to 23,8% in 2003 and 2014, occurred. The land use classification analysis of the WCA for 2015 shows a decrease of the cotton area by 38% and rice by 22% and, on the contrary, an increase of wheat fields by 30%, compared with a classification map for 2002.
The average water use amount has noticeably decreased from 9.5 thousand m3 to 8.1 thousand m3 per ha and from 9.5 thousand m3 to 8.1 thousand m3 per ha respectively in province and district scale between 1998/2010.
Considerable yield increase in all crop types over the last decade. The highest increase recorded was for vineries at about five fold from 2.17 t/ha to 10.7 t/ha, fruit at four times increase from 3.21 t/ha to 9.4 t/ha, between 2003 and 2014.
Current occupation: PhD candidate at Wageningen University





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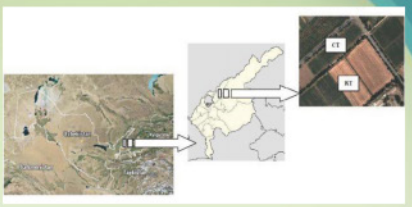
Name: Nargiz Mirtalipova
Type of degree: Master
Study period: 2012-2014
Host university: Wageningen University
Home university: Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

Thesis title: The effects of fallow period on carbon sequestration and potential of conservation agriculture implementation in Tashkent Province, Uzbekistan

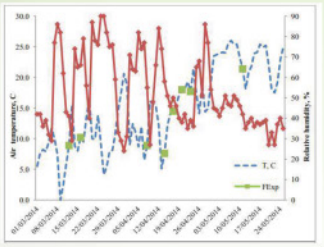


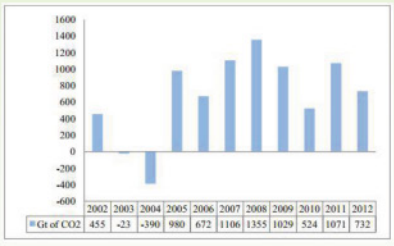
Abstract:

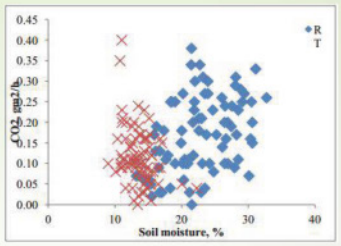
Fallow period is an important stage in the determination of inter-annual variability in CO2 emissions of crops. Each soil tillage type and agricultural management practice has certain influence on soil conditions. Calculations of CO2 emissions values, based on IPCC Guidance methodology were used as a comparison model with the results of field experiments.

Research questions:

The objective of the present study was to examine the effect of conventional and conservation tillage types on soil CO2 fluxes with additional analysis of other external factors, such as temperature values, moisture rates and organic C content during fallow period. Conservation agriculture issue was investigated as a potential way of carbon sequestration on agricultural soils of Uzbekistan.







Conclusions:

Among the main reasons the decomposition of crop residues and biological activity of growing winter wheat can be defined. Since the study plot assumes an experimental set up of CA management practices, the alternative ways of agricultural management can decrease the current level of CO2 emissions.

As an alternative practice, the execution of crop residue removal, seeding of cover crop instead of winter wheat or other agricultural crops and leaving the soil bare during fallow period can be determined. The use of more advanced and up-to-date methods and models of GHGs, particularly CO2 emissions in the GHGs inventory in Uzbekistan with additional attention to arable land use type would lead to the reduction of time needed for the analysis of this issue. The possibility to calculate the level of CO2 emissions/sinks on arable lands would allow analyzing the potential of C sequestration and the implementation of conservation agriculture in Uzbekistan.

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Double Degree Master Program between TIIAME and WUR

Name: Mamanbek Reimov

Mobility level: MSc

Duration: 18 months

Host university: Wageningen University

Home university: Tashkent Institute of Irrigation and Melioration

During my study mobility in Wageningen University I took different courses related to Environmental Systems Analysis department and conducted a research with my supervisors prof. Dolf de Groot, Dr. Victor Statov and prof. Alim Pulatov on topic "*Using Ecosystem Service Analysis to develop a zonal map for the Lower Amudarya State Biosphere Reserve in Uzbekistan*", which was chosen for my Master thesis work.

During about two years stay abroad I can say I learnt a lot, the main and important one is gaining knowledge in the sphere of Environment including main principles of environmental science, international environmental assessments (Environmental Impact assessment and its requirements and etc.), Ecosystem services and its types, Environmental costs and benefit analysis, Stakeholder analysis and other educational skills which can improve my educational skills and will need me in my future career.

During this two years period I had a chance to introduce my country abroad. We organized different Uzbek evenings and holidays, take part in exhibition representing our home institute Tashkent Institute of Irrigation and Melioration. At present time I returned to my home country with Master of Science degree from one of the highly ranked Universities in the world in the sphere of Environment science, Food technology and GIS. My next mission is apply all my skills and gained knowledge in the way of development of my country in the sphere of environmental protection, environmental education, conducting and analyzing Ecosystem Services including Environmental Impact assessment and sustainable development.

"The highest result of education is tolerance". Hellen Keller

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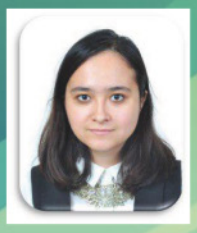
ERASMUS MUNDUS ACTION 2

TASHKENT INSITUTE OF IRRIGATION AND AGRICULTURAL MECHANIZATION ENGINEERS

ECOGIS CENTER - 15 YEARS IN EDUCATION, RESEARCH AND INNOVATION

WAGENINGEN UNIVERSITY & RESERCH

Double Degree Master Program between TIIAME and WUR



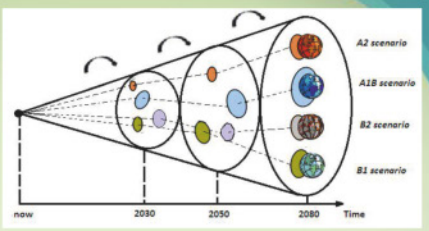
Name: Umida Solieva
Type of degree: Master
Study period: 2013-2015
Host university: Wageningen University
Home university: Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

Thesis title: Climate change perception of Farmers in Tashkent Province, Uzbekistan

Supervisor at host university: Dr. Andre van Amstel

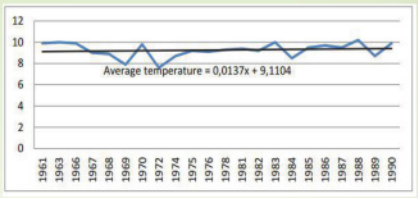
Research questions:

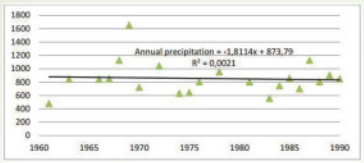
-What are the patterns of temperature and rainfall of Tashkent Province has changed in two thirty years (1960-1990 and 1984-2014)?
-How do farmers perceive climatic changes in Tashkent Province?
-What are the driving factors of farmer" climate change perception and what are their part in formulation of perception?
-What are the scenarios of Tashkent Province for the future (2080)?



Conclusions:

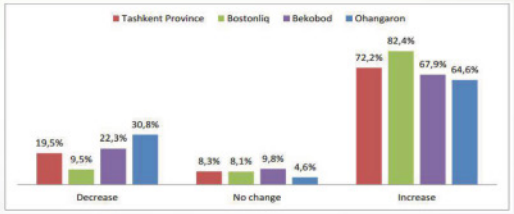
The analysis showed that both temperature and precipitation of Tashkent province is increasing. For temperature growth for 1 O C in study areas, 30.6 years could be enough if the same path of progress will be continued. For increase of precipitation to 10 mm, 16.9 years could be required.





In study areas – Ohangaron and Bekobod, most farmers were conscious about climate change in Province (89.9 % average). 81.1 % of respondents claimed that they perceived the increase in temperature and 72.2% of respondents perceived increase in precipitation over the last years. Research calculations showed that age, education and experience and information usage from external sources have positive effect, while extension services has negative effect.

Farmers were having difficulties with climate change consequences like increase of agricultural pests in their fields (41.5%), lessened water availability (21.6%), decrease of yield (16.2%) etc. Scenario analysis for Tashkent Province was done. Scenario analysis was based on the data of Uzhydromet and 4 descriptive scenarios were made for the study area. These scenarios are alike to IPCC scenarios and descriptions were built according to the interview with specialists on climate change of Uzbekistan.



Current occupation: Consultant, International Water Management Institute (Central Asian Office)

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Double Degree Master Program between TIIAME and WUR

Name: Kanoatkhon (Mushtaree) Umurzakova
Type of degree: Master
Study period: 2013-2015
Host university: Wageningen University
Home university: Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

Thesis title: Making the agricultural innovation system of Uzbekistan: development of agricultural technology by partnership in the case of Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

Supervisors at host university: Associate proffesor, Laurens Klerkx and Aarti Gupta

Research objective

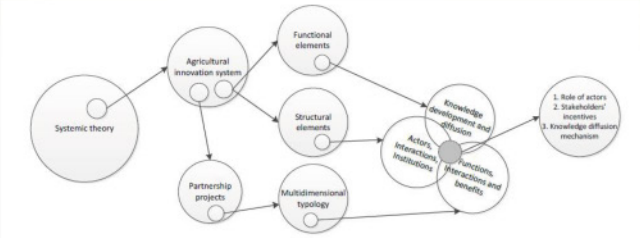
The main research objective of this research is to study knowledge development and diffusion processes by partnership interactions, and influence of institutional factors to these interactions.

1. To study role of actors in developing knowledge in partnership project.

There were investigated duties of actors and an administrative hierarchy, which in further analysis gave insights of intuitional environment and its influence the partnership work.

2. To study incentives of actors to develop knowledge in partnership. There were studied overlapping objectives of actors and conflicting incentives slowing down effective knowledge development.

3. To study knowledge diffusion in partnership project. It was studied enabling and disabling factors influencing the diffusion of knowledge within and outside of partnership.



Conclusions:

It can be concluded that farm level projects need transdisciplinary multilevel design. Because, projects in this level face with more real case issues than research projects with controlled environment. Therefore, there is need for more disciplines to be involved in technology development process, at same time flexibility in decision-making procedures.

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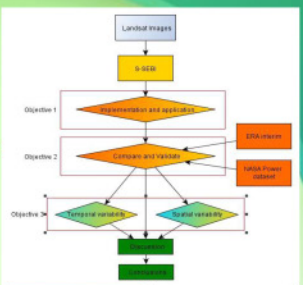
Double Degree Master Program between TIIAME and WUR

Name: Adil Yakubov
Type of degree: Master
Study period: 2011-2014
Host university: Wageningen University
Home university: Tashkent Institute of Irrigation and Agricultural Mechanization Engineers

Thesis title: Mapping evapotranspiration of agricultural land in Tashkent Province by using GIS and remote sensing



Supervisor at host university: Professor Arnold Bregt, Dr. Ryan Teuling

Research objective:

To assess the spatial and temporal variability in the evapotranspiration of Tashkent province by using GIS and remote sensing

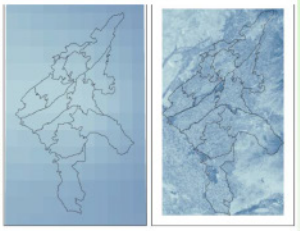
- Calculate the ET using remote sensing model
- Evaluate the ET calculations by comparison with an external dataset
- Assess spatial and temporal variability in the evapotranspiration

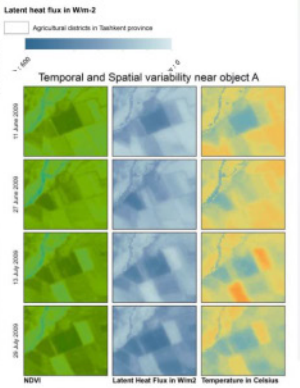
Conclusions:

From the results of the ET estimation the general conclusions are:
- Areas with a lower temperature have a higher ET, because ET is a cooling process as it converts sensible heat into latent heat.
- Areas with a high NDVI show an increase in the ET, because they have the potential to contribute to the transpiration part of ET.

The ET estimated by S-SEBI is strongly related to the ET estimated by ERA-Interim. This is shown by the correlation coefficient of 0.78 between these variables. This strong relationship indicates that the estimated ET values of S-SEBI are relatively accurate and representative for Tashkent Province. Thus, this method of ET estimation by S-SEBI can be applied to larger areas of Uzbekistan in further studies.

From the temporal variability of ET it can be concluded that the latent heat flux and thus the ET changes corresponding to the crop growing and harvesting seasons. The latent heat flux is the highest around the summer just before the harvesting season; this is the time when crops stop growing. A correlation test between the ET of different dates support these outcomes. The spatial variability between districts showed to be larger in 2009. A difference in ET between districts can be caused by different crop types and different irrigation systems and seasons.





Current occupation: Assistant of Professor at EcoGIS center, TIIAME

Publications:

Yakubov A., Pulatov A., Bregt A., Teuling R. (2015). Assessment of evapotranspiration on agricultural land by S-SEBI algorithm in Tashkent Province, Uzbekistan. The Central Asia GIS Conference – GISCA 2015, 128

Yakubov A., Pulatov A. (2015). The Impact of the temperature to water loss through evapotranspiration of rural area in Tashkent Province. Конференция к международному году почвы и дню земли 2015, 54-57

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The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 5,000 employees and 10,000 students, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.