FOOD BIOTECH

Food BioTech 2021

August 23-24, 2021

Sustainable waste management: opportunities for the universities in the frameworks of EduEnvi project

Olga Sergienko, Irina Sergeeva (Russia),
Zhanar Shortanbayeva y (Republic of Kazakhstan),
Sergey Polbitsyn (Russia), Ella Kallio (Finland)

ITMO UNIVERSITY

ITMO University,
St. Petersburg, Russia

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

FOOD BIOTECH

Food BioTech 2021

August 23-24, 2021

Education and Research in the field of Circular Economy

Multidisciplinary Collaboration for Precise Food Science Development

Dr. Olga Sergienko

ITMO UNIVERSITY

ITMO University,
St. Petersburg, Russia

“The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.”

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

FOOD BIOTECH

Project Enhancing Competences of Sustainable Waste Management in Russian and Kazakh 2017-2021

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

EDUENVI

Erasmus+
Enriching lives, opening minds.

9 Universities

Russia – Kazakhstan – Denmark – Finland – Spain

8 Modules, 20 courses, 60 ECTS

1. Environmental risks related to waste management
2. Biotechnologies for waste utilization
3. Non- energy technologies for waste utilization
4. Energy technologies for waste utilization
5. Business and entrepreneurship
6. Public administration policy and municipal waste management
7. Environmental management and waste prevention
8. Life cycle analysis and life cycle costing

FOOD BIOTECH

New tracks of Masters program “Industrial Ecology”

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

Possibility for building individual study trajectories based on students’ personal interests, advanced laboratory equipment, professional software and innovative problem based educational technologies

- Industrial Ecology
- Cleaner Production Integrated Management in cooperation with Zittau University (Germany)
- Eco-design since 2020
- Urbanecolog since 2021

New professional Courses at ITMO University

Methods and devices for eco-analytical research	Modern management systems based on international standards	Corporate environmental management
New energy and resource saving processes in circular economy	Environmental audit	Environmental design and life cycle assessment
Processes and technologies of segregating and deep cleaning of contaminated environs	Organization of cleaner production	Best available techniques in industry

Research groups

FOOD BIOTECH

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

Eco-monitoring

Use of wireless sensor networks for monitoring various environmental objects: landfills, rivers, gaseous emissions

Waste to Energy

RDF and SRF production
Waste incineration
Waste pyrolysis
Energy efficiency analysis of various options of heat utilization

Urbanecology

Plant health
Phytoremediation of contaminated soils
Investigation of impact of highways

Industrial Ecology and Circular Economy

Circular biotechnologies

Obtaining secondary raw materials and energy resources from waste
Composting and recycling of solid waste
Biofuel production
Biodegradable materials
Biological methods for unpleasant odors treatment

Forest and marine resources quality

Quality of wild berries and mushrooms
Accumulation of heavy metals in green plants
Quality of aquatic resources

LCA and eco-design

LCA of food products and ingredients
LCA of alternative energy sources in agriculture and food industry
LCA of building construction materials
S-LCA in the food industry

FOOD BIOTECH

Research laboratories

Laboratory of eco-monitoring

Laboratory of bio-testing

Laboratory of industrial ecology

FOOD BIOTECH

Industrial Partners and employment of graduates

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

BALTIKA
Part of the Carlsberg Group

WRIGLEY
A Subsidiary of Mars, Incorporated

VODOKANAL
SAINT-PETERSBURG

FGUP
“Vodokanal St. Petersburg”

TOYOTA

Coca-Cola

JSC Environmental Bureau “Kosmos”

Unilever

Pit PRODUCT

TPV

SEVERNAYA
POULTRY PRODUCTION

FGUP “TEST-St. Petersburg”

FOOD BIOTECH

Food BioTech 2021

August 23-24, 2021

SUSTAINABLE WASTE MANAGEMENT: OPPORTUNITIES FOR THE UNIVERSITIES IN THE FRAMEWORK OF EduEnvi PROJECT

Dr. Irina Sergeeva

ITMO UNIVERSITY

ITMO University,
St. Petersburg, Russia

“The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.”

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

FOOD BIOTECH

Co-funded by the Erasmus+ Programme of the European Union

EDUENVI

MODULE 5 “DEVELOPMENT OF BUSINESS AND ENTREPRENEURSHIP FOR SUSTAINABLE WASTE MANAGEMENT”

Courses’ basic features:

- Interdisciplinarity
- practice-oriented approach
- business partner involvement

FOOD BIOTECH

Co-funded by the Erasmus+ Programme of the European Union

EDUENVI

MODULE 05 >> Развитие бизнеса и предпринимательств в сфере устойчивого управления отходами

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

ITMO UNIVERSITY

COURSE

Бизнес-планирование проектов устойчивого управления отходами

AUTHOR

Медведева Ольга Евгеньевна

Цимбалист-Колесникова Ирина Андреевна

MODULE 05 >> Развитие бизнеса и предпринимательства в сфере устойчивого управления отходами

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

ITMO UNIVERSITY

COURSE

Моделирование бизнес-процессов в сфере управления отходами

AUTHOR

Орлова Ольга Петровна

Коваленко Борис Борисович

Сергеева Ирина Григорьевна

FOOD BIOTECH

Co-funded by the Erasmus+ Programme of the European Union

EDUENVI

GREEN BUSINESS MODEL INNOVATION

Drivers:

- increased consumer awareness towards sustainability
- possibility for companies to establish a competitive advantage by being more environmentally friendly

Barriers:

- lack of knowledge and skills throughout the entire value chain
- high cost of new equipment and new materials
- expensive infrastructure systems for recycling and reuse of materials

FOOD BIOTECH

Co-funded by the Erasmus+ Programme of the European Union

EDUENVI

GREEN BUSINESS MODEL

Incentive models:

- Functional sales (FS) or product service systems and performance-based models

Life-cycle models:

- Cradle to cradle (C2C)
- Take back management (TBM)
- Green supply chain management (GSCM)
- Industrial symbiosis (IS)

FOOD BIOTECH

Co-funded by the Erasmus+ Programme of the European Union

EDUENVI

EVENTS IN THE DEVELOPMENT OF COURSE CONTENT

- Meeting with the Deputy Chairman of the Finance Committee of St. Petersburg on project "Your Budget“
- Canvas Business Plan intensive weeks conducted by the University of Tampere
- International Conferences "Strategies and tools for economic management"

FOOD BIOTECH

Food BioTech 2021

August 23-24, 2021

The impact of the EduEnvi project on the University's activities

Zhanar Shortanbayeva
Al-Farabi Kazakh National University
Zhanar.Shortanbaeva@kaznu.kz
+7(701)724-49-80

ITMO UNIVERSITY

ITMO University,
St. Petersburg, Russia

“The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.”

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

FOOD BIOTECH

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

2 modules

Non-energy technologies for waste utilization

Energy technologies for waste utilization

5 online courses

1. Basics of waste utilization
2. Reuse of side products and outputs
3. Physical-chemical treatment methods in waste management
4. Waste-to-energy plants and technologies
5. Energy efficient technologies in waste treatment

MOOCS

При поддержке
Министерства образования
и науки РК

http://open.kaznu.kz

FOOD BIOTECH

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

WP7 - Piloting new curricula and learning modules and exploitation of the materials

University	Bachelor	Master students	Doctoral students	Teachers	Company Employee	Total
TumSU	44	-	-	2	-	46
URFU	-	49		3	-	52
ITMO	1	2	-	-	-	3
KokSU	-	3	-	-	1	4
SQSU	2	3	-	1	4	10
KazNU	4	21	-	4	-	29
Other	16	1	2	2	-	21
Total	67	79	2	12	5	**165**

https://eduenvi.tamk.fi/ru/2020/04/02

FOOD BIOTECH

Educational process

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

KWR

Сбор и Сортировка Вторсырья

Methodical part

Training seminars
Teaching methods
E-learning tools
English language cours
New disciplines
Educational programs (updating existing and developing new educational programs, double degree programs)

Communication with business

Involvement of employers in the educational process
Internship bases
Current topics of final qualifying works
The model of graduate in the labor market

Алматы электр станциялары АҚ
АлЭС
АО Алматинские электрические станции

ТАРТІП
АКЦИОНЕРЛІК КОҒАМЫ

recycle бірге

FOOD BIOTECH

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

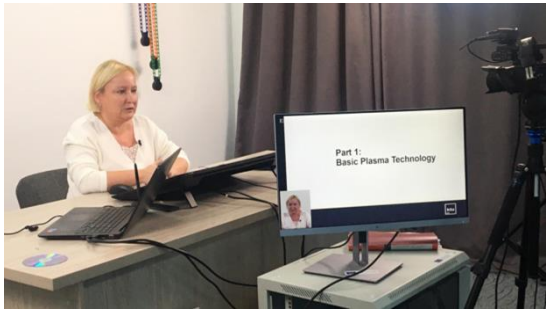
Financial support

Equipment for recording video courses
Electronic databases
Application software packages for the educational process and scientific research

The science

Round table within the framework of the International Conference
Publications of scientific articles
Introduction of the results of scientific research into production

OXFORD ACADEMIC | Journals



Cooperation

Strengthening ties between universities of Kazakhstan
International cooperation
Mobility of students and teachers

FOOD BIOTECH

Food BioTech 2021

August 23-24, 2021

SOLID WASTE MANAGEMENT: EDUCATIONAL AND MANAGERIAL APPROACH

Dr. Sergei Polbitsyn
Ural Federal University

ITMO UNIVERSITY

ITMO University,
St. Petersburg, Russia

“The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.”

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

FOOD BIOTECH

Sustainable Solid Waste Management

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

- Graduate program “Sustainable Solid Waste Management” since 2020
- The objective of the program: to contribute to building a global elite group of professionals in public administration with all necessary theoretical and practical skills in the field of development of projects and programs in sustainable solid waste management
- Educational programs: Sustainable Solid Waste Management (urfu.ru)

FOOD BIOTECH

Together with our Danish partners

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

Sustainable Solid Waste Management

- We developed three courses as the part of the project.
- These courses were included as optional courses for students of the program “International Entrepreneurship” since 2019:
- Institutional approach to SWM decision-making
- Budget and financial base of SWM
- Public administration and municipal government in SWM

FOOD BIOTECH

1. Institutional approach to SWM decision-making

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

- To show the development of environmental thinking and the reason of foundation of institutional economics as new scientific field of the economics science.
- To highlight the relationship between environment and economic institutions at macro and micro-economic context, the applied tools and methods.
- To analyze the current status of economic institutions of sustainable solid waste management.
- To analyze main methods and techniques how to apply institutional approach in the field of sustainable solid waste management

FOOD BIOTECH

2. Budget and financial base of SWM

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

Learning outcomes:

1. Understanding of budgeting items at all levels of governance.

2. Redistribution of financial sources between different power level.

3. Understanding of sources of financing to implement SWM plans and programmes.

4. Ability to implement cost efficiency analysis of different SWM schemes.

5. Ability to make comparative analysis of legislative approaches, regulations and procedures in sphere of SWM budgeting and financing (Russia, EU, Kazakhstan).

FOOD BIOTECH

3. Public administration and municipal governance in SWM

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

Learning outcomes:

1. Ability to identify priorities, goals and indicators of state and municipal policy in SWM.
2. Distribution of power between different level in SWM. Redistribution of competences.
3. Ability to perform municipal level control of SWM programs.
4. Ability to make comparative analysis of legislative approaches and regulations in this sphere (Russia, EU, Kazakhstan).

FOOD BIOTECH

Our next story

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

Based on the achievements of EduEnvi project we prepared the application and were awarded the grant from Vladimir Potanin Foundation to develop the online course on Smart-cities.

FOOD BIOTECH

Food BioTech 2021

August 23-24, 2021

Sustainable waste management: Erasmus + EduEnvi project

Olga Sergienko, Irina Sergeeva (Russia)
Zhanar Shortanbayeva (Republic of Kazakhstan)
Sergey Polbitsyn (Russia)
Ella Kallio (Finland)

ITMO UNIVERSITY

ITMO University,
St. Petersburg, Russia

“The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.”

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

FOOD BIOTECH

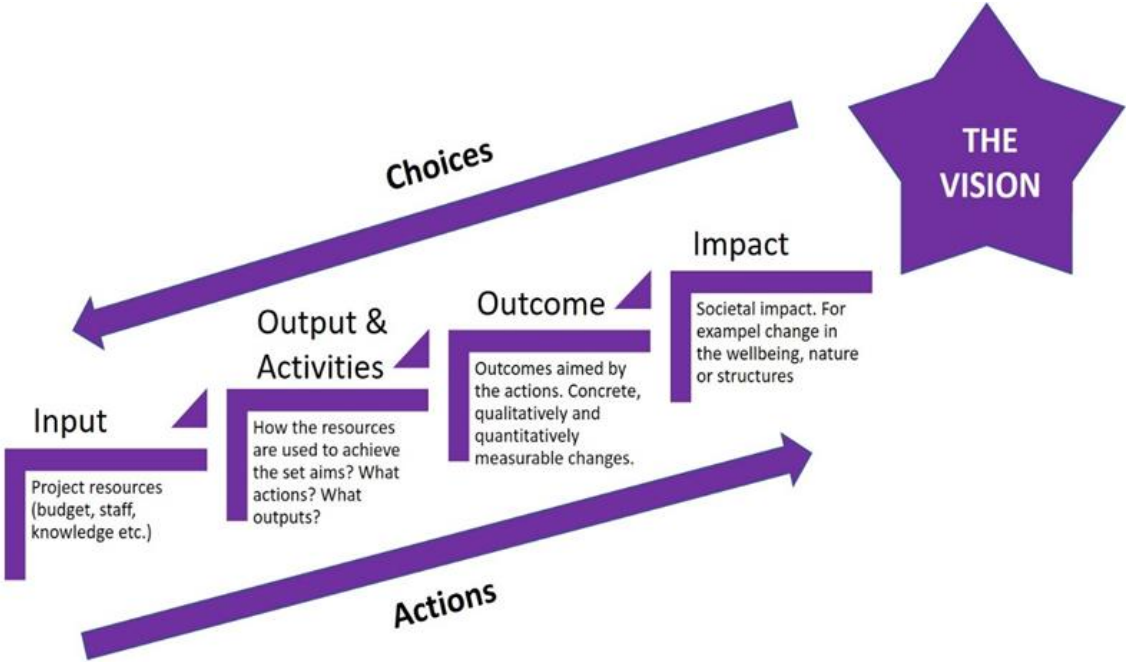
INPUT-OUTPUT-OUTCOME-IMPACT CHAIN

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

- Steps towards future oriented project work
- In every project it is important to make reflection around the impacts and this way contribute to future development
- Framework helps to illustrate what kind of resources, outputs and activities and concrete changes are required to achieve the societal impact, i.e. the ultimate goal of the project.



FOOD BIOTECH

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

Impacts in the partner countries

Central Asian Regional Cluster meeting where the impacts of CBHE Projects started in 2015-2017 in Central Asia where discussed was organized in Nov 2020 by EACEA.

Overall impacts gathered from the projects:

- Modernisation of curriculum
- Fostering regional cooperation
- Promoting University & Business cooperation
- Supporting quality, accessibility and internationalisation of universities

FOOD BIOTECH

Findings compactly in EduEnvi

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

- **Increasing Student-orientation in education**: Shifting emphasis from teaching to learning
- **Capacity building while developing online courses**: Gaining deeper knowledge on SWM substance and on how to design pedagogically high-quality online course

  “learning by doing”

- **Raising University level questions**: The technology and processes for producing online courses in universities should be functional. Raising this kind of results will contribute to further development.
- **Acting with a very current topic**: The competitiveness of the partner universities are increasing by development of master level online courses in the field of SWM.

FOOD BIOTECH

Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs

EDUENVI

Co-funded by the Erasmus+ Programme of the European Union

Working and developing in a team together

- a great opportunity!