

A Case Study of a University's strategic approach to curriculum development for embedding interdisciplinarity for the Sustainable Circular Bioeconomy across all Bachelor degree programmes. Estonian University of Life Sciences.

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Structure of the presentation

- | Shortly about the Estonian University of Life Sciences
- | Idea to build up a new, interdisciplinary subject
- | Preparatory activities
- | „Fundamentals of Bioeconomy“ 4 ECTS
- | Students ' feedback

Eesti Maaülikool (EMÜ)

Estonian University of Life Sciences

One of the 6 public universities in Estonia, 4th in size among public Estonian universities

The only university in Estonia whose priorities in academic and research activities provide the sustainable development of natural resources

Mission

The University creates and shares knowledge to the promoters of bio-economy for the best of Nature and Man.

Vision

The University is an internationally recognized research university in the field of bio-economy.



Academic Structure

Comprises 3 Research Institutes and 1 College:

Institute of Agricultural and Environmental Sciences

Institute of Forestry and Engineering

Institute of Veterinary Medicine and Animal Sciences

Tartu Technical College





Agriculture



Environ-
ment



Forestry



Health and
Food



Technology
and
production



Rural
Economy

Green Economy, Bioeconomy, Circular Economy, Circular Bioeconomy

STRATEGIC FIELDS / AREAS
Targets

Research and Development activities

Research at international level

Studies

*Recognised university education,
graduates in high demand
on the labour market*

**Members of the
University Community**

Advancing, motivated, united

Society

*EMU promotes development
in its areas of responsibility.
EMU fosters economic,
cultural and social development.*

Organisation

*Organisation stimulates the main
activities of the University members,
a modern and attractive
learning and working environment.*

Strengths of EMU
VALUE-CHAIN APPROACH TO BIO-ECONOMY SECTOR

SERVING THE SOCIETY

**ENTREPRENEURIAL
COOPERATION**

*SUSTAINABLE BIO-
ECONOMY*

**SMART SPECIALISATION
AREAS OF GROWTH**

*More efficient use of resources:
healthy food, wood and timber,
bioenergy, water, waste management*

HEALTH TECHNOLOGIES AND SERVICES:
biotechnology

STUDIES

*EFFICIENCY
QUALITY*

RESEARCH AND INNOVATION

CAPACITY - QUALITY - COOPERATION

Responsibility areas in academic activities are aggregated into six focal areas

Agriculture

Forestry

Technology
and engineering

Health and food

Environment

Rural economy

**Effective/ efficient management of natural resources, food security
and renewable energy, climate changes, animal and public health.**

Idea

When analyzing the university curricula in 2017 , it became clear that curricula include subjects that address specific areas of bioeconomy, but the systematic holistic approach was missing.

The goal was to create for all BSc. students a subject that provides basic knowledge of various aspects of bioeconomy.

Preparation

- | Selling the idea to Senate' s Study Committee
 - | Holistic view
 - | Interdisciplinarity
 - | Cooperation between institutes
 - | Cooperation between students
- | Topics to be covered in the subject
- | Meetings and discussions with potential lecturers

Preparation

- | Target group. Which year of undergraduate studies?
- | Topics to be covered in the subject
- | Study methods
- | Meetings and discussions with potential lecturers

Fundamentals of Bioeconomy, 4 ECTS

- | The nature and trends of bioeconomy.
- | The sectors and production chains of bioeconomy.
- | The definition and classification of biorefineries.
- | Land and biomass resources and their estimation (global and regional level).

Fundamentals of Bioeconomy, 4 ECTS

- | The conversion technologies of agricultural biomass
- | Waste management within the bio-economy concept
- | The environmental aspects of bioeconomy
- | Planning of bioeconomy-based production
- | The economical, social and political factors of bioeconomy development

Study outcomes

| *At the end of this course the student is expected to:*

*know the main trends of bioeconomy as well as **global and regional factors** affecting the field*

*estimate the availability, quality and location of agricultural **biomass resources***

*differentiate the biomass **conversion technologies** and to appreciate the innovation involved*

*understand the **interdisciplinary nature** of the fields of bioeconomy*

Forms of studies

- | Lectures: 30 hrs
- | Seminars: 10 hrs
- | Individual work (incl group work): 64 hrs

R&D based lectures

| Soil science

Agronomy

| Forest science

Biotechnology

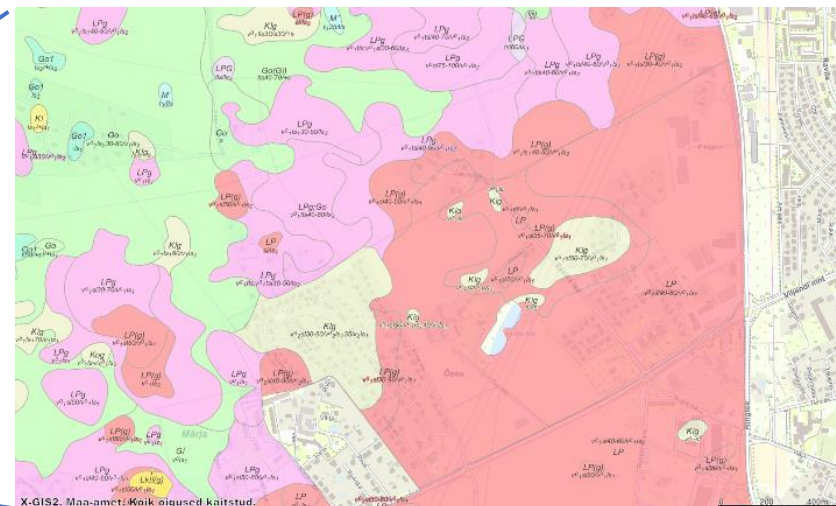
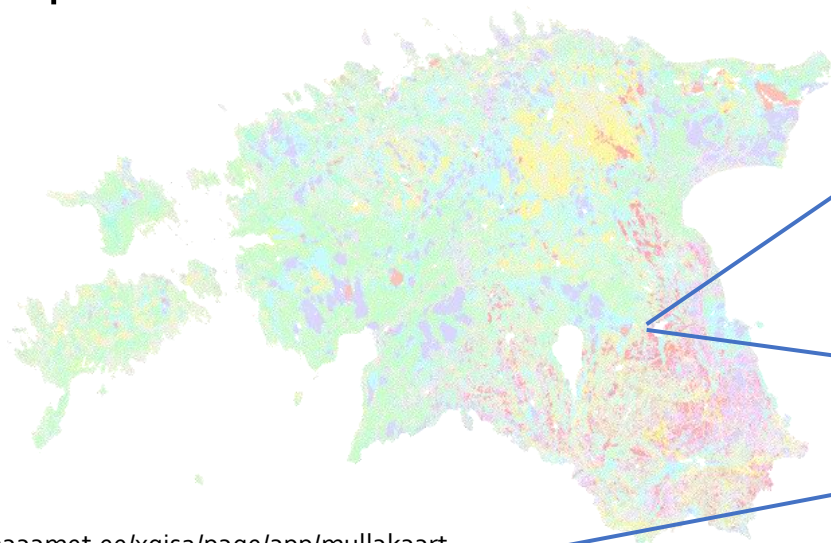
| Waste management

Animal science

| Rural Economics

Smart solutions to help a farmer: soil data

Soil map 1:10 000

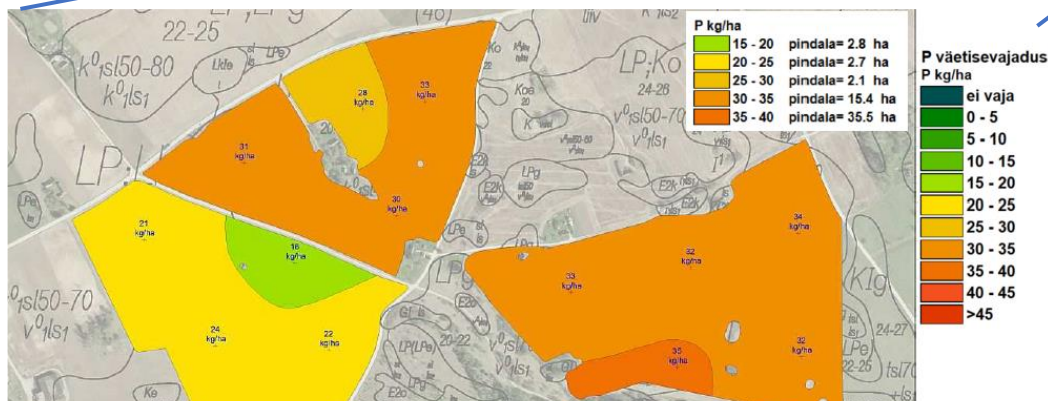


<https://xgis.maaamet.ee/xgis2/page/app/mullakaart>

X-GIS2. Maa-amet. Kõik õigused kaitstud.

Drones image analysis – soil, plants

0 25 50 75 km



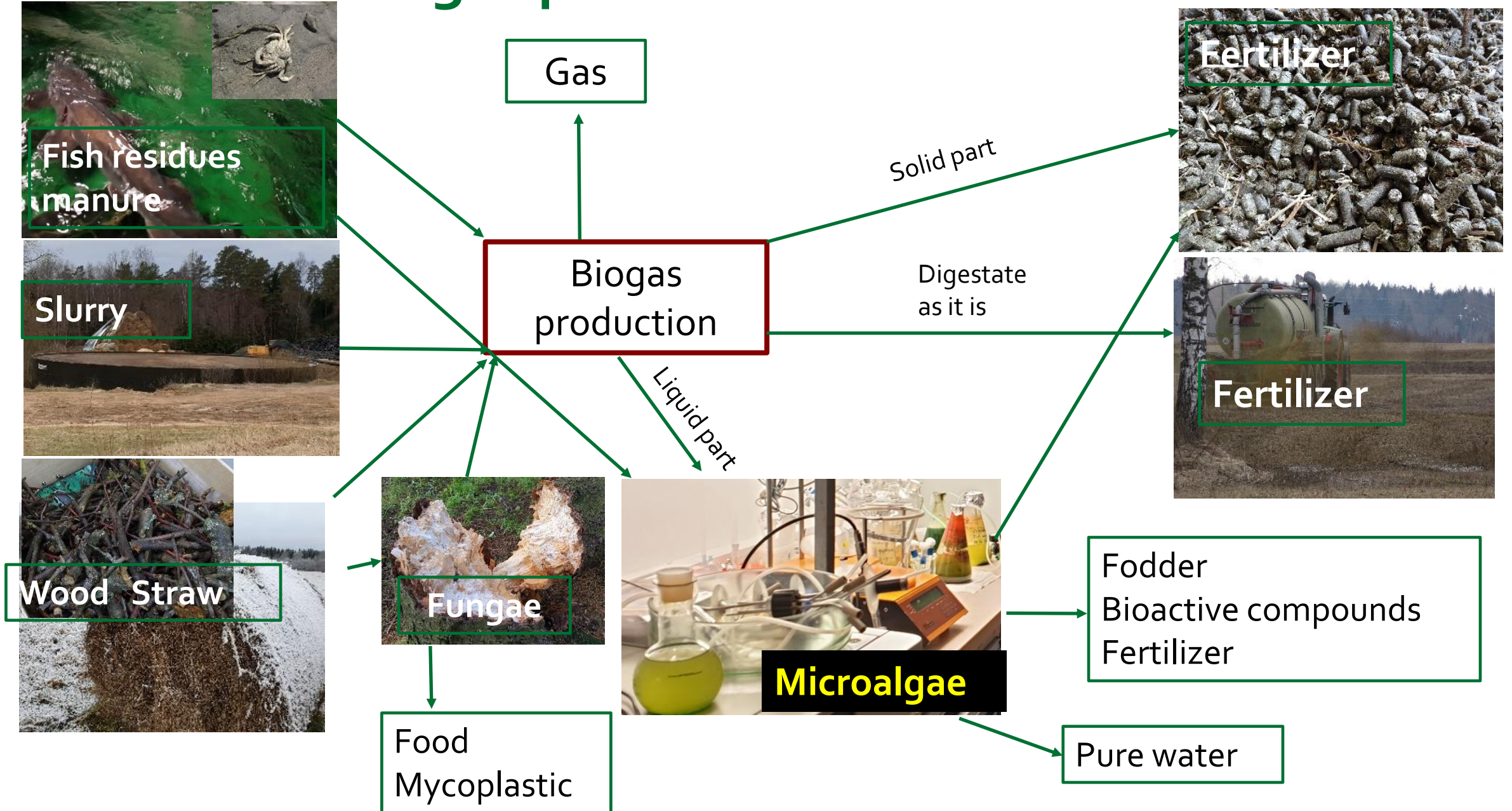
P fertilization need according to data analysis and expected yield

Map applications



Soil suitability for different crop growth

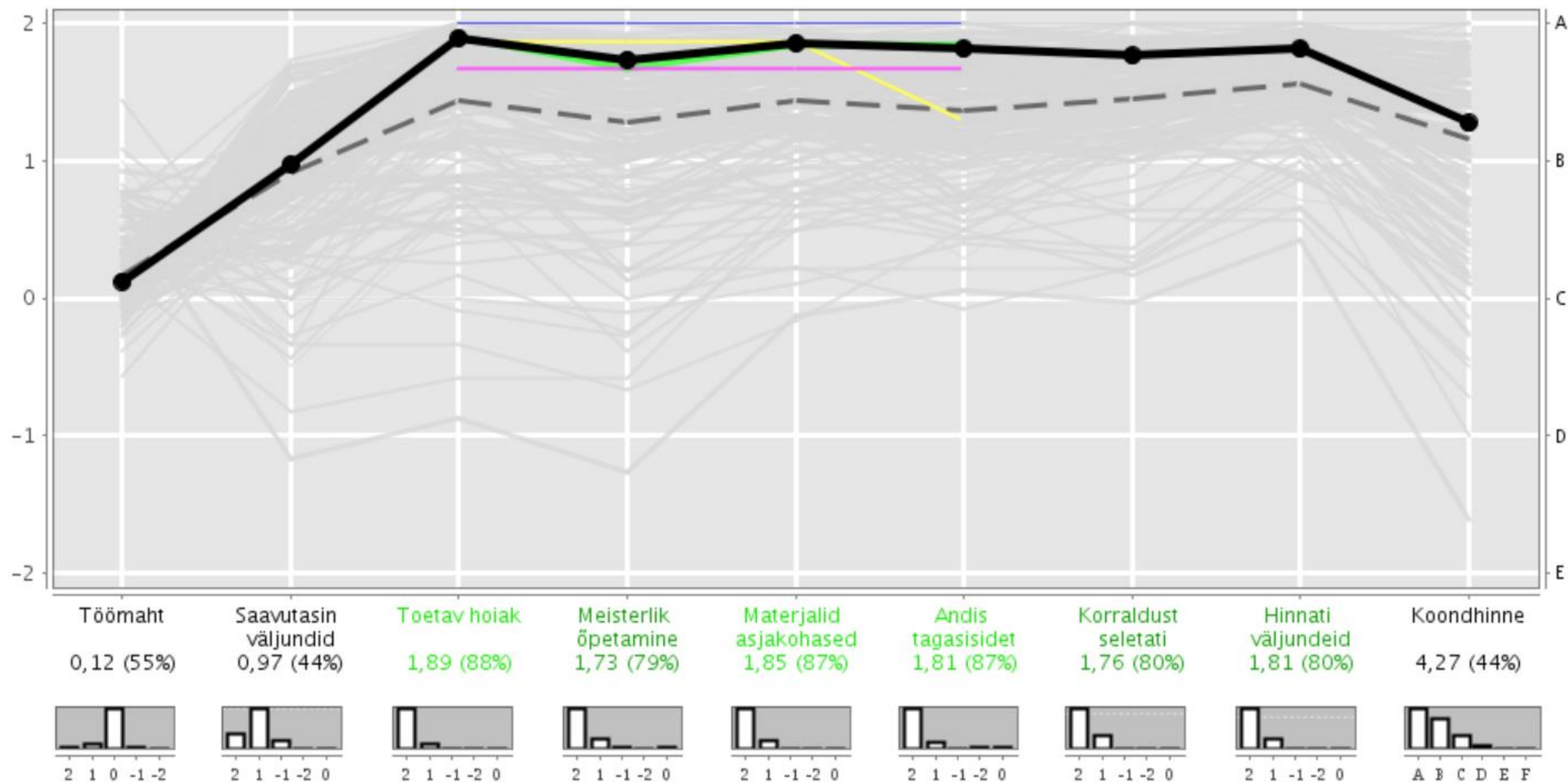
Biowaste – biogas production



Examples of group works

- | Potentiality, technology and economic feasibility of the use of peat resources.
- | Bioethanol production in Estonia. Raw materials, technology and economic viability.
- | Treatment of animal waste for energy production.
- | Fish stocks, their exploitation and value chains of production .

Students' feedback, N=78



Students' feedback

- | I liked that I was encouraged to think more broadly and see things outside my field.
- | The intermediate deadlines for group work helped to get things done on time.
- | Students could choose the group members themselves, as this would make the group work smoother.

Students' comments to other students

- | A subject that broadens the horizons. Be sure to ask questions!
- | The lectures on the subject of bioeconomy are very exciting, be sure to attend. That way, you'll have less to learn for yourself.
- | The bioeconomy is the future! Listen and act.

Thank You for Your Attention!

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