Slide 1:

Eesti Maaülikool — Estonian University of Life Sciences · TARTU ÜLIKOOL · SEI STOCKHOLM ENVIRONMENT INSTITUTE · E L F · Landbúnaðarháskóli Íslands

Adapting to a Changing Climate: Natural Environment and Bioeconomy

Risks, Impacts & Adaptation

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on behalf of the **BioClim** team

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Slide 2:

Contents

1. Methods

2. Priority themes for natural environment and bioeconomy

3. Risks & impacts

4. Adaptation measures

pre-given **themes**:

I NATURAL ENVIRONMENT:
1. Biodiversity
2. Terrestrial
3. Freshwater and
4. Marine ecosystems
5. Ecosystem services

II BIOECONOMY:
6. Agriculture
7. Forestry
8. Fishery
9. Hunting
10. Tourism
11. Peat extraction

Slide 3:

BioClim project: team

Jan. 2015 – Aug. 2015

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Slide 4:

Methods

Literature review and **expert assessments:**

1. priority themes for Estonia regarding adaptation

2. pre-defined climate scenarios for Estonia until 2100 (RCP4.5 and RCP8.5) (Luhamaa et al. 2015) – assessment of **risks**, **vulnerabilities and climate change impacts** on the 11 domains and their priority themes

3. suggestions for **adaptation measures** for the national adaptation strategy and action plan, considering **four time-periods**: until 2020; until 2030; 2021–2050; and 2051–2100.

Slide 5:

2. Priority themes: natural environment & bioeconomy

Slide 6:

I NATURAL ENVIRONMENT: PRIORITY THEMES

Thematic field	NATURAL ENVIRONMENT				
Themes	1) Biodiversity	2) Terrestrial ecosystems	3) Freshwater ecosystems	4) Baltic Sea	5) Ecosystem services
Priority themes	Threatened species	Forests	Large lakes	Sea eutrophication	Sea ecosystems' services
					Freshwater ecosystem services
	Invasive alien species	Wetlands	Small lakes	Alien species and biodiversity	Forest ecosystem services
	Protected areas	Meadows and other agricultural lands	Flowing water-bodies	Foodwebs	Mire-ecosystem services
					Pollination
					Soil ecosystem services
					Meadow ecosystems' services
					City-ecosystem services

II BIOECONOMY: PRIORITY THEMES

Thematic field	BIOECONOMY					
Themes	6) Agriculture	7) Forestry	8) Fishery	9) Hunting	10) Tourism	11) Peat extraction
Priority themes	Plant cultivation	Forestry & forest industry	Baltic Sea fish resource & fishery	Game species, abundance & diseases	Tourism destinations & seasonality	Policy documents affecting the domain
	Animal husbandry	Silviculture		Game species' food base & damage	Tourism transport	GHG emissions from peatlands
	Plant protection & veterinary	Forest pathology	Inland waters' fish resource & fishery	Hunting as a social activity	Nature toursim	Impact on volumes of peat extraction
						Peat extraction technologies
						After-extraction use

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3. Risks & Impacts

I NATURAL ENVIRONMENT – risks & impacts

Risks:
- ↑ ℃
- changes in
  - precipitation
  - snow / ice cover duration
  - levels of sea / inland waters

Impacts:
- Changes in **species composition** & possible extinctions
- **Invasive species** & **algae blooms, eutrophication**
- Faster ecosystem **metabolism** – GHG emissions

- Extreme weather events – supporting, regulating and cultural ecosystem services

- Many **unknown** risks & impacts + synergetic '-' impacts

II BIOECONOMY – risks & impacts

Risks:
- ↑ ℃ and thermal variability
- ↑ precipitation amounts
- snow cover duration
- extreme weather

Impacts:
- **Changes** in **plant physiology**, longer production periods

- Forest **industry** (timber transport) & **species compositions**
- Agricultural **pests, diseases & forest pathogen** outbreaks

- Fishery: changes in commercial fish stocks?

- Tourism: longer summer periods + 'bad' winter weather

- High **uncertainty**!

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4. Adaptation

II NATURAL ENVIRONMENT – adaptation

- **Climate sensitive indicators**!

- **Invasive alien species**' impacts & control measures

- Algal blooms – early warning systems

- **Expand monitoring** and **research**
  - **precise** assessments of **risks, impacts** and **vulnerability** of ecosystems

II BIOECONOMY – adaptation

Agriculture:
- Diversified production
- Decision support

Forestry:
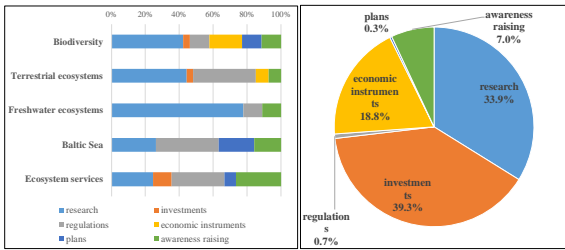- Careful planning of fellings
- Silvicultural measures

Tourism
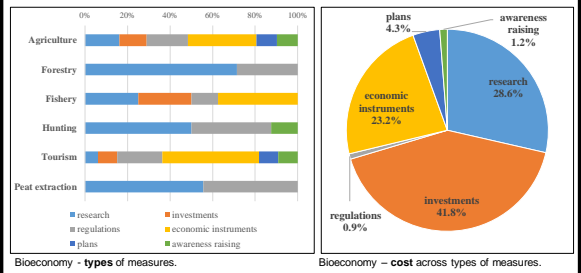- more summer & less winter tourism?

NB! Research to identify **exact factors** influencing resources – in the context of **changing climate**

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5. Summary

I NATURAL ENVIRONMENT: **54 measures** with 126 actions

Natural environment – **types** of measures.

plans 0.3%
awareness raising 7.0%
economic instruments 18.8%
research 33.9%
investments 39.3%
regulations 0.7%

Natural environment – **cost** across types of measures.

II BIOECONOMY: **44 measures** with 103 actions

Bioeconomy - **types** of measures.

plans 4.3%
awareness raising 1.2%
economic instruments 23.2%
research 28.6%
investments 41.8%
regulations 0.9%

Bioeconomy – **cost** across types of measures.

Thank you!

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http://pk.emu.ee/bioclim