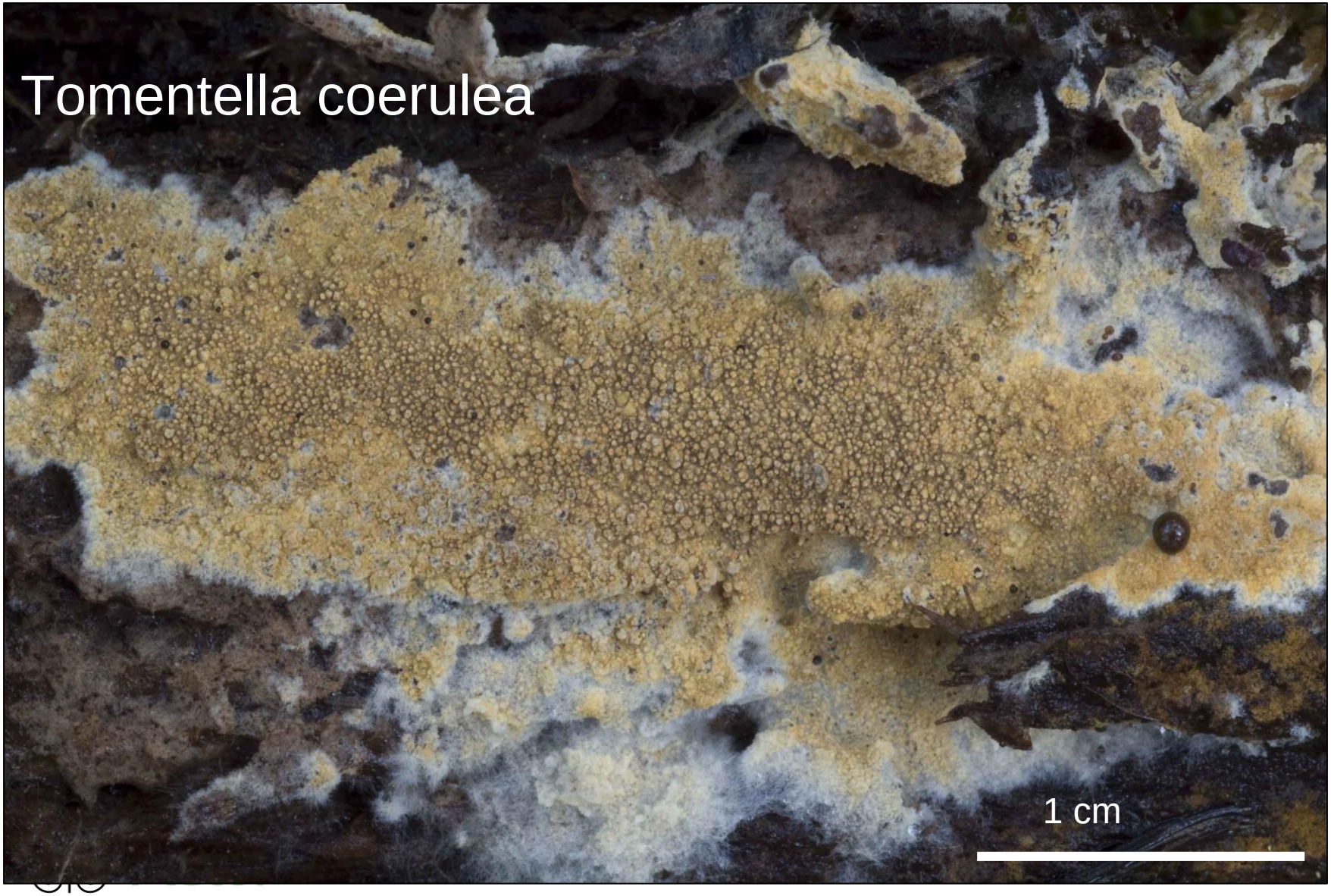
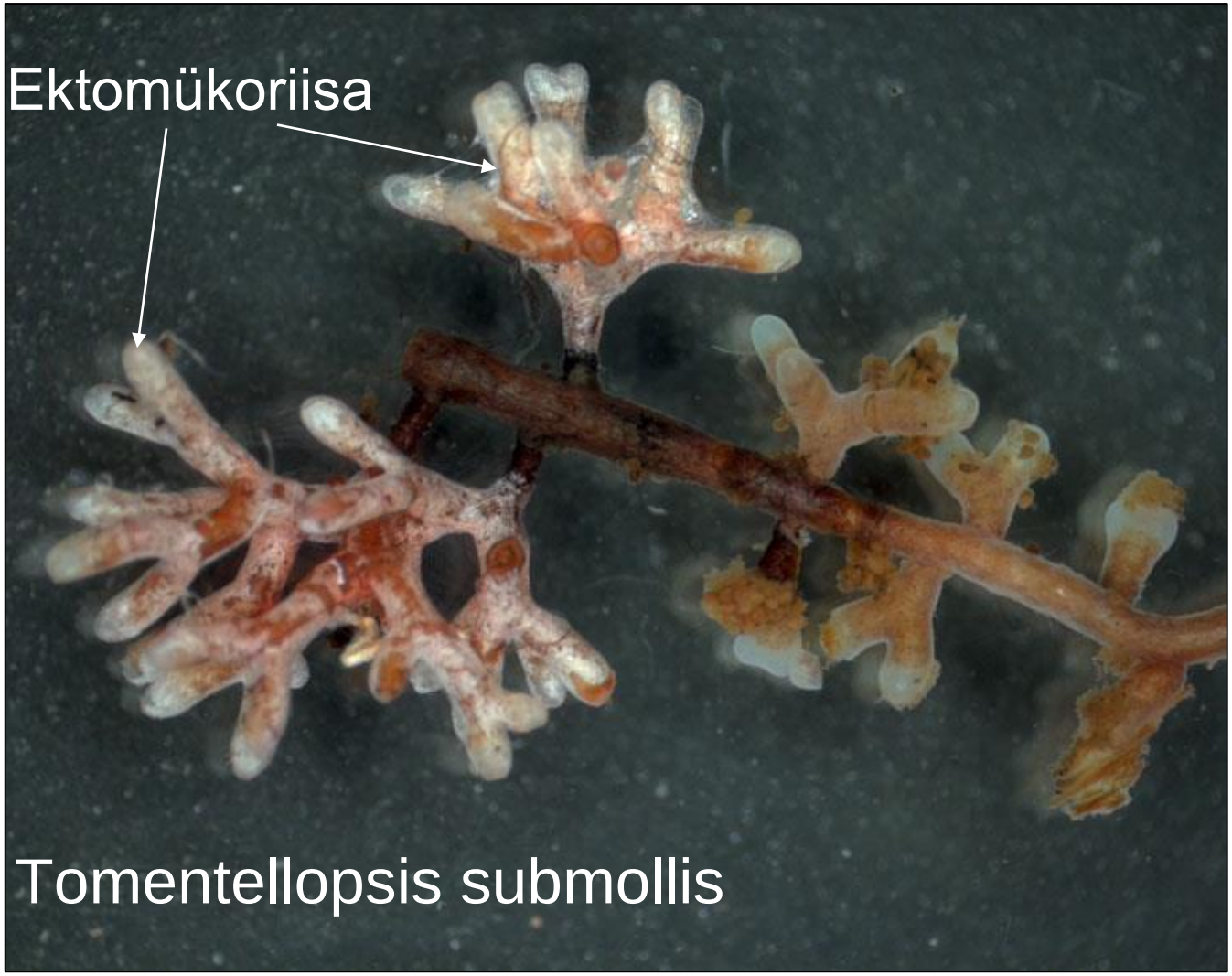
Globaalsed muutused elurikkuse ja koosluste hävitajana

Urmas Kõljalg
TÜ loodusmuuseum ja botaanikaaed



NATARC


Ektomükoriisa
Tomentellopsis submollis

Inimpopulatsiooni kasv=>tootmise ja tarbimise kasv

Uuringud näitavad et elurikkuse vähenemine kiireneb jätkuvalt

Kuidas muuta tootmist ja tarbimist viisil mis aeglustab elurikkuse vähenemise tempot?

Sest seda protsessi ei ole ei ole võimalik järgneva 30 aasta jooksul peatada.

Ambitsioonikas eesmärk:
2050 aastaks vähendada elurikkuse kadumise tempot poole võrra.

Selleks vajalikud drastilised muudatused põllumajanduses, metsanduses, söömisharjumustes (liha osa vähendamine) ja kliimamuutuste leevendamine.

Traditsiooniline elurikkuse kaitse seotud kaitsealade ja liikide kaitse meetmetega. Selle laiendamine jätkuvalt oluline. Eriti vähekaitstud ökosüsteemid ja valitud liikide kaitse. Neil piiratud mõju inimtegevusest tulenevale survele.

Vajalik süsteemne ja koordineeritud lähenemine mis samaaegselt mõjutab inimtegevuse erinevaid aspekte.

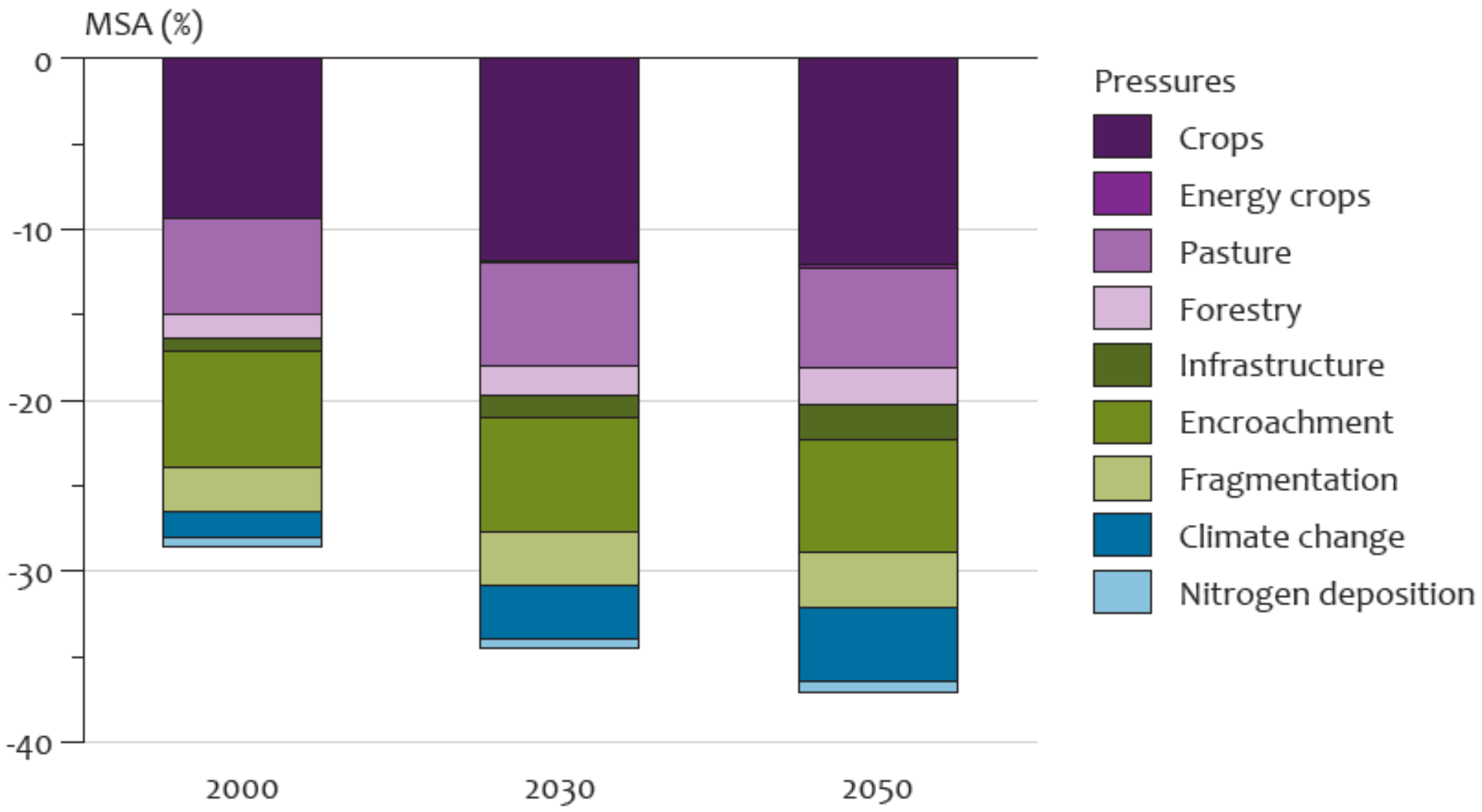
Püüab inimmõjusid pigem suunata kui takistada.

Keskmine liigirikkus
(Mean species abundance (MSA))

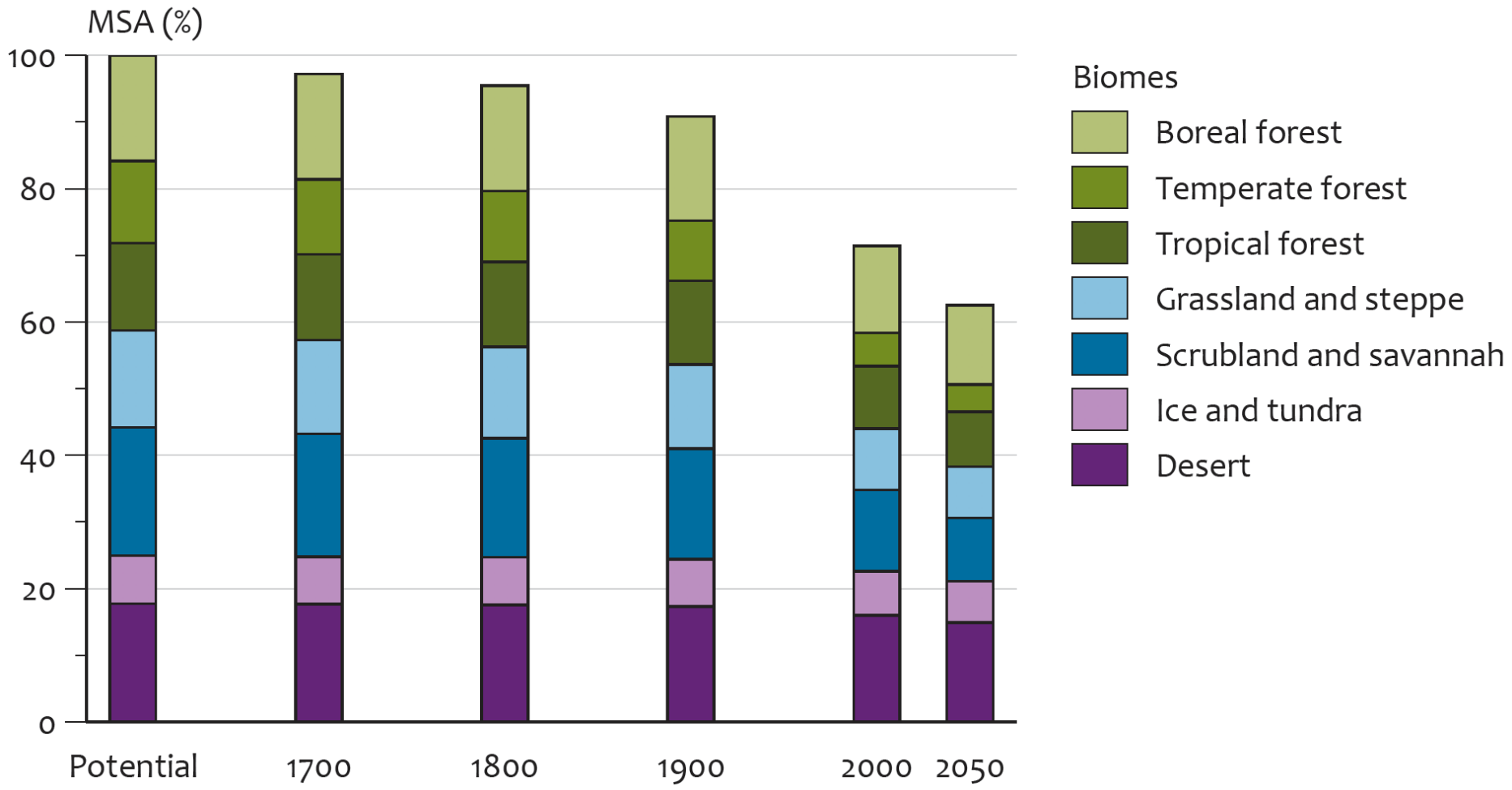
Liikide arv ja ohtrus võrreldes algse seisundiga

Source: Netherlands Environmental Assessment Agency (2010) Rethinking Global Biodiversity Strategies: Exploring structural changes in production and consumption to reduce biodiversity loss.

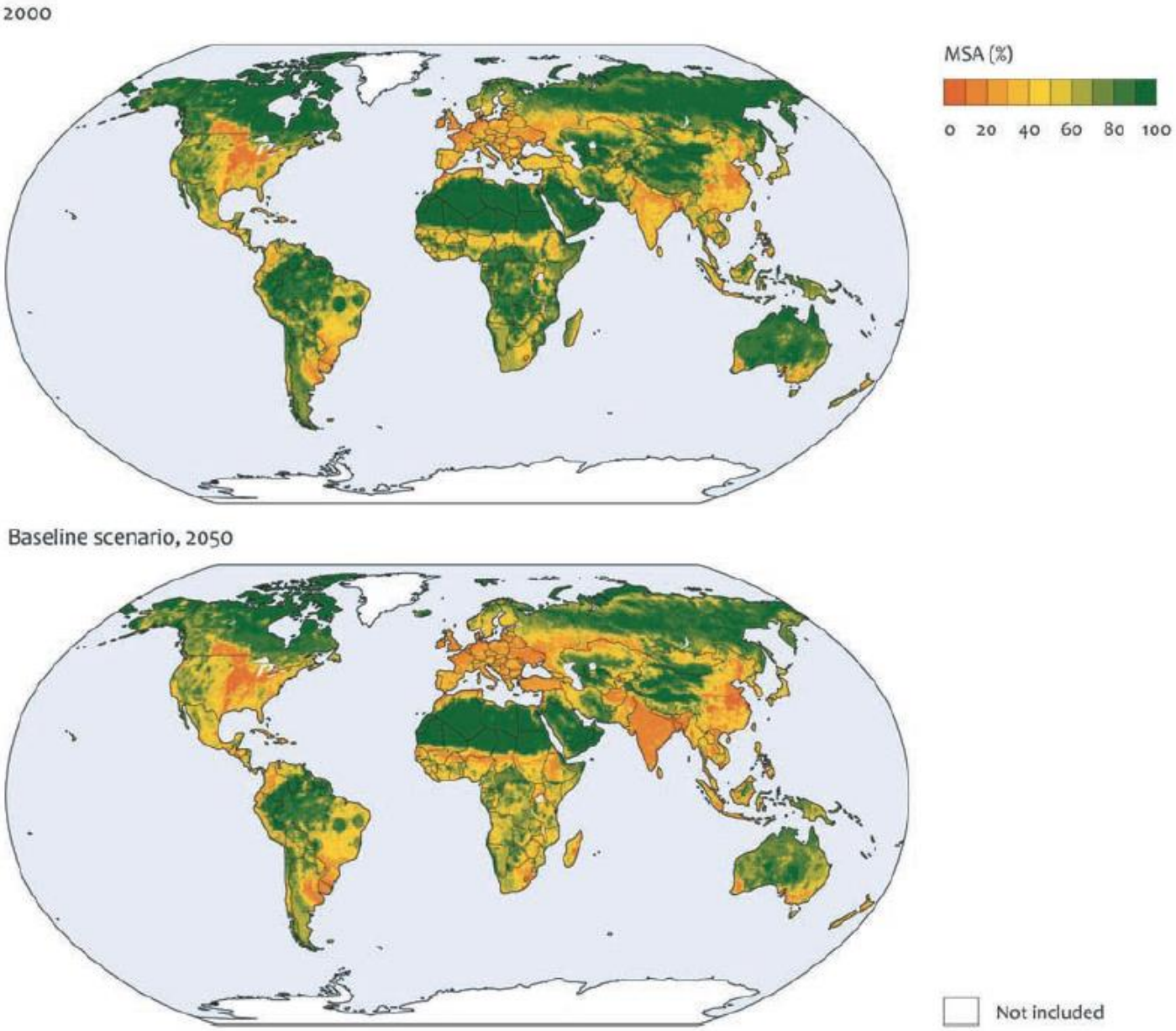
Inimtegevuse poolt põhjustatud MSA muutus



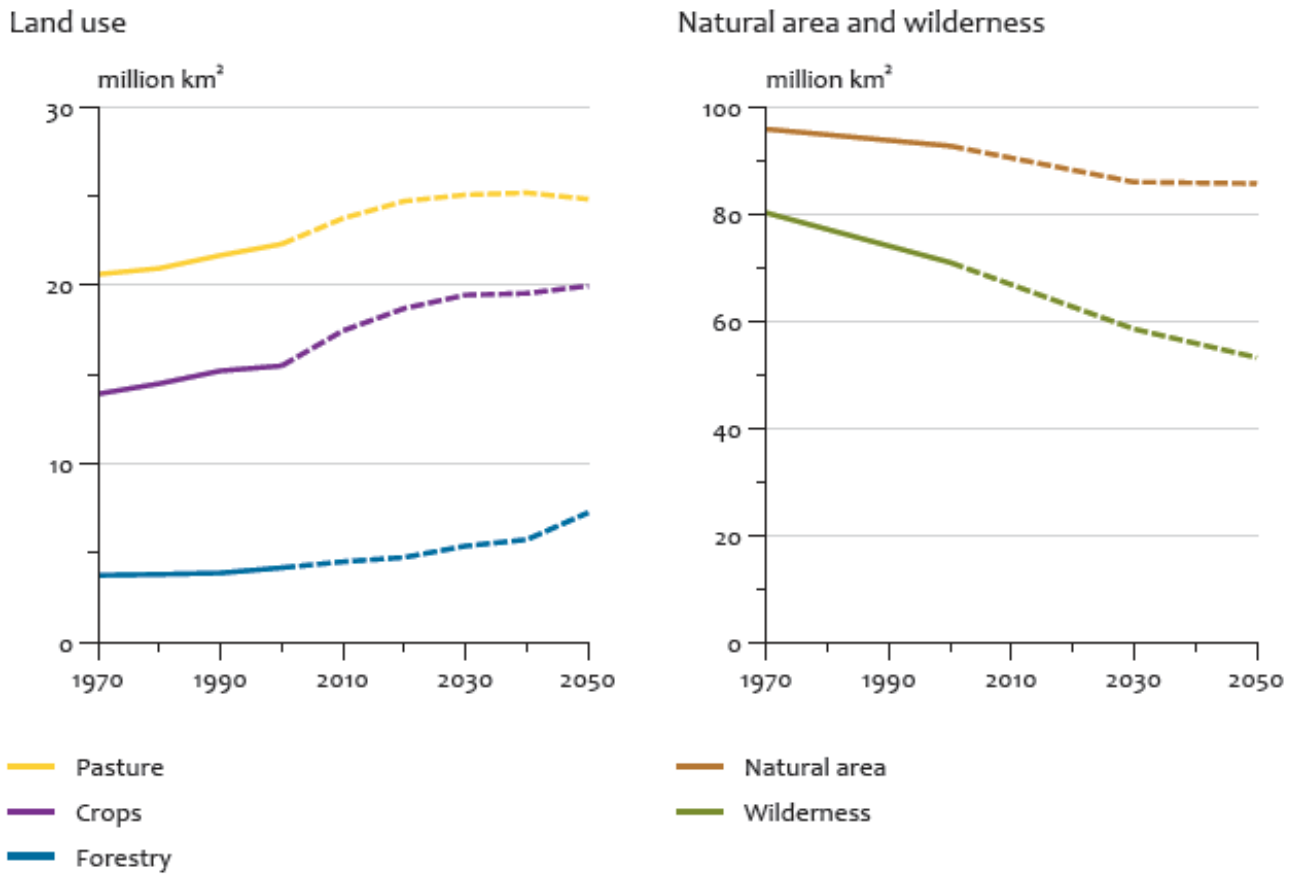
MSA muutus ilma täiendavate meetmeteta



MSA muutus ilma täiendavate meetmeteta



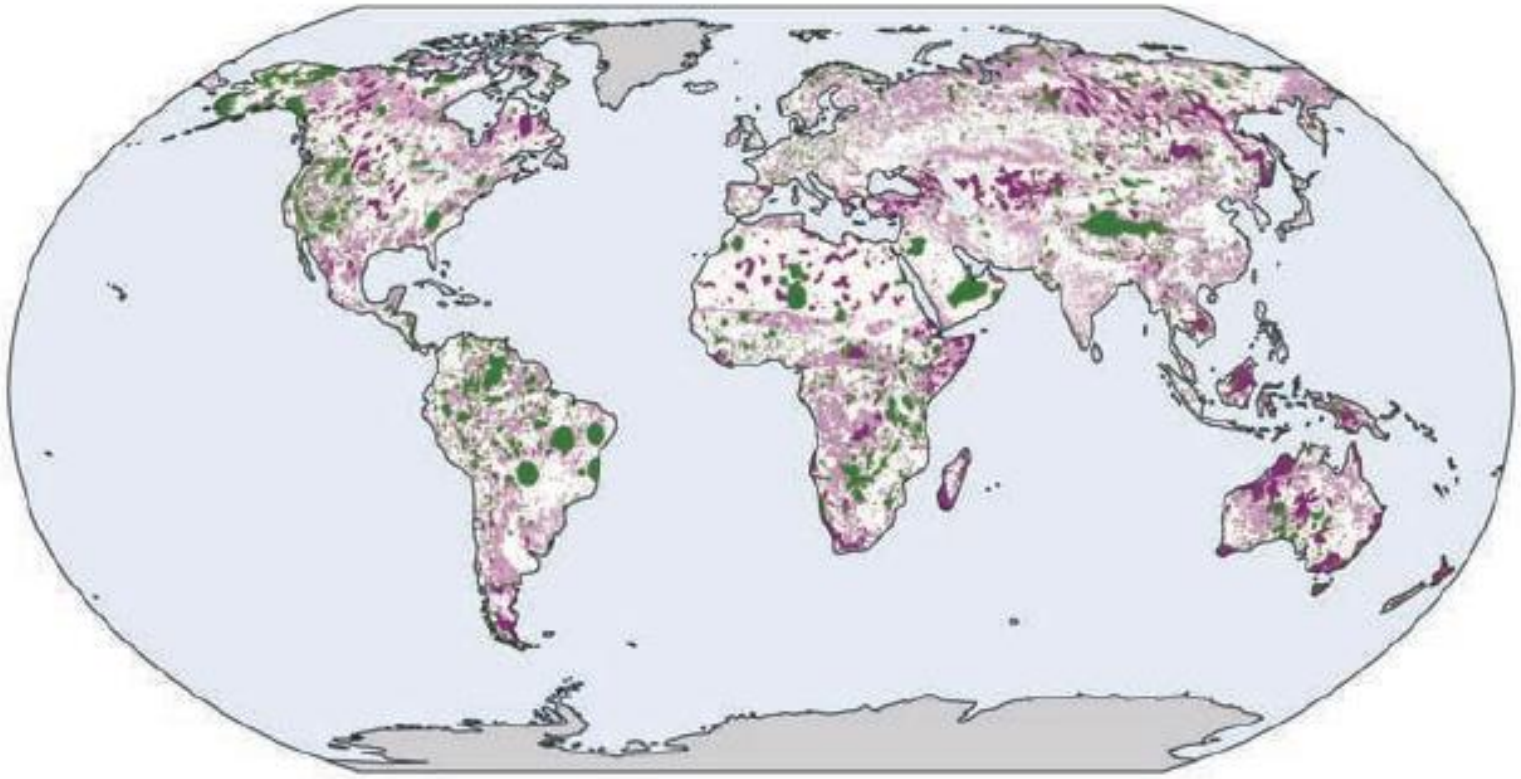
Maakasutus ja looduslik keskkond (meetmeteta)



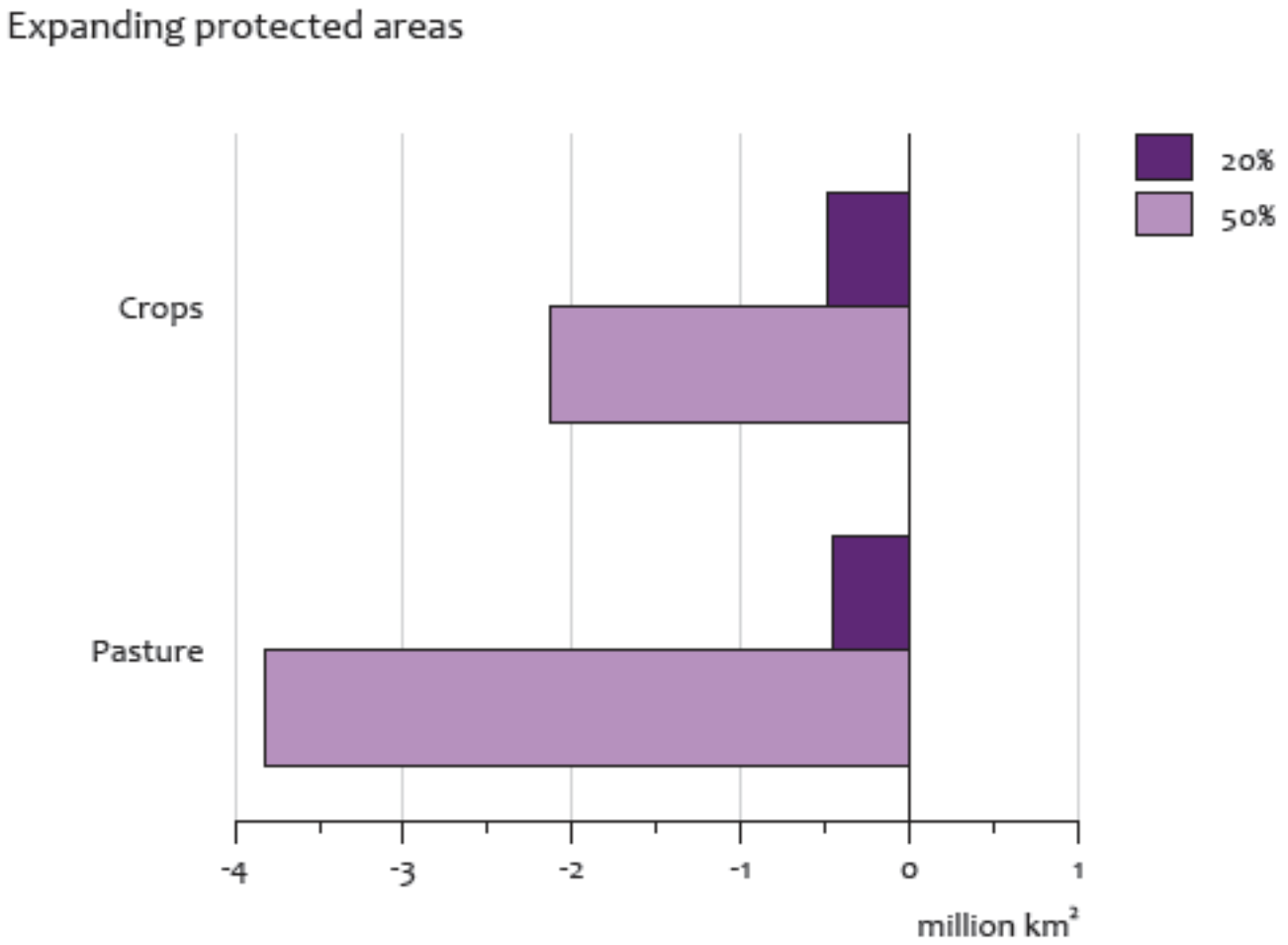
Kaheksa viisi globaalse elurikkuse vähenemise aeglustamiseks

1. Kaitsealade suurendamine
2. Metsade hävimise vähendamine
3. Saagikuse kasv põllumajanduses
4. Toidu käitlemise kaod
5. Toitumisharjumuste muutmine
6. Metsamajandamise kaasajastamine
7. Kalandus - väljapüügi vähendamine
8. Kliimamuutuste leevendamine

1. Kaitsealade suurendamine



1. Kaitsealade mõju põllumajandusele

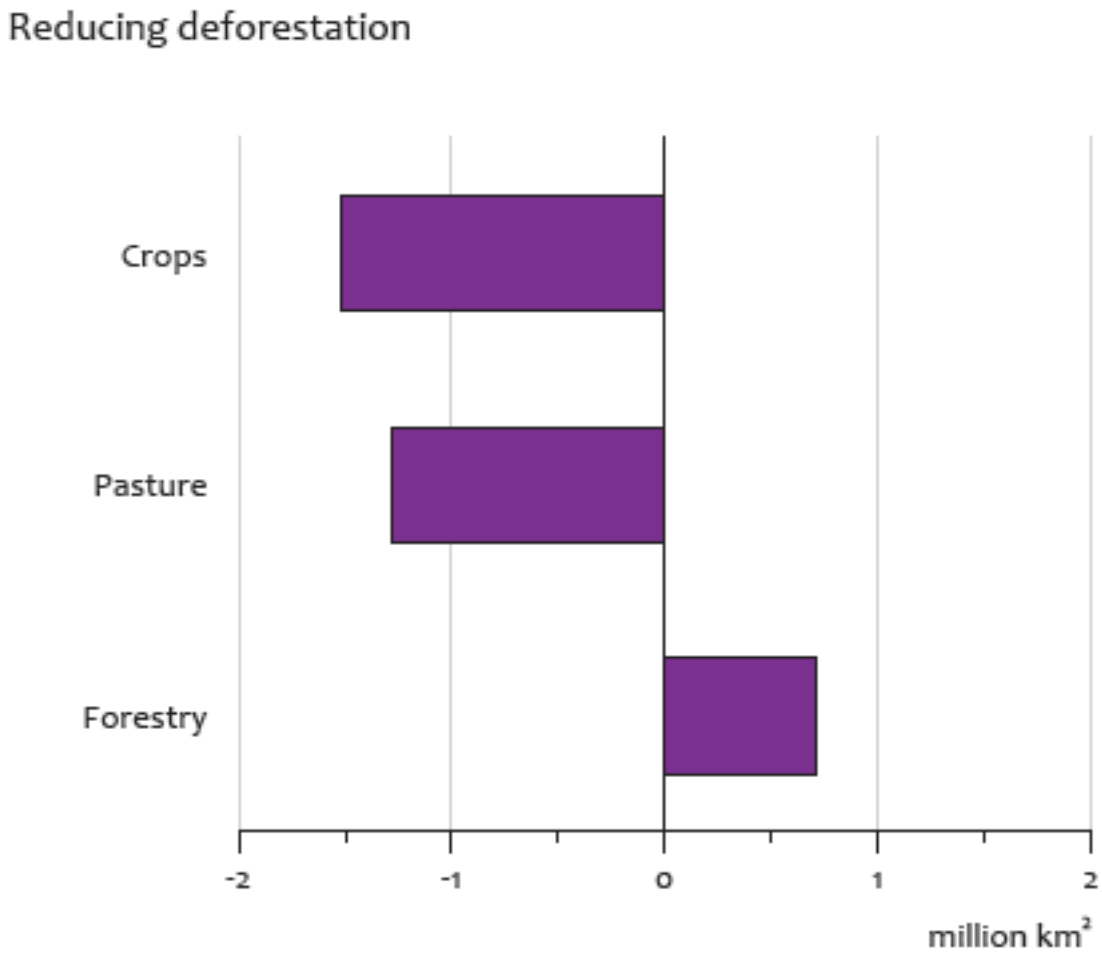


Land use for crops and pasture by 2030 is about 1 million km_2 smaller in area under the option with expanding protected areas to 20% and about 6 million km_2 less in the option with expanding protected areas to 50%.

1. Kaitsealade globaalne rahastamine

Globally, about 14% of terrestrial areas are within the boundaries of a protected area (Coad et al., 2009; excluding Antarctica and Greenland). However, these areas are not equally distributed over biomes and ecoregions. There are also large differences in the adequacy of funding required for effective protection. Without effective management, protected areas are vulnerable to influences that are not in line with an area's purpose. Costs associated with management of protected areas can depend on management objectives, accessibility and size of the area (Bruner et al., 2004). The annual global investment in conservation was estimated to be USD 6 billion (using 1996 USD; James et al., 2001). Funding gaps for management of the existing protected areas in developing countries are estimated to range from USD 1 to 1.7 billion annually (Bruner et al., 2004). Funding gaps in developed countries are assumed to be smaller (James et al., 2001).

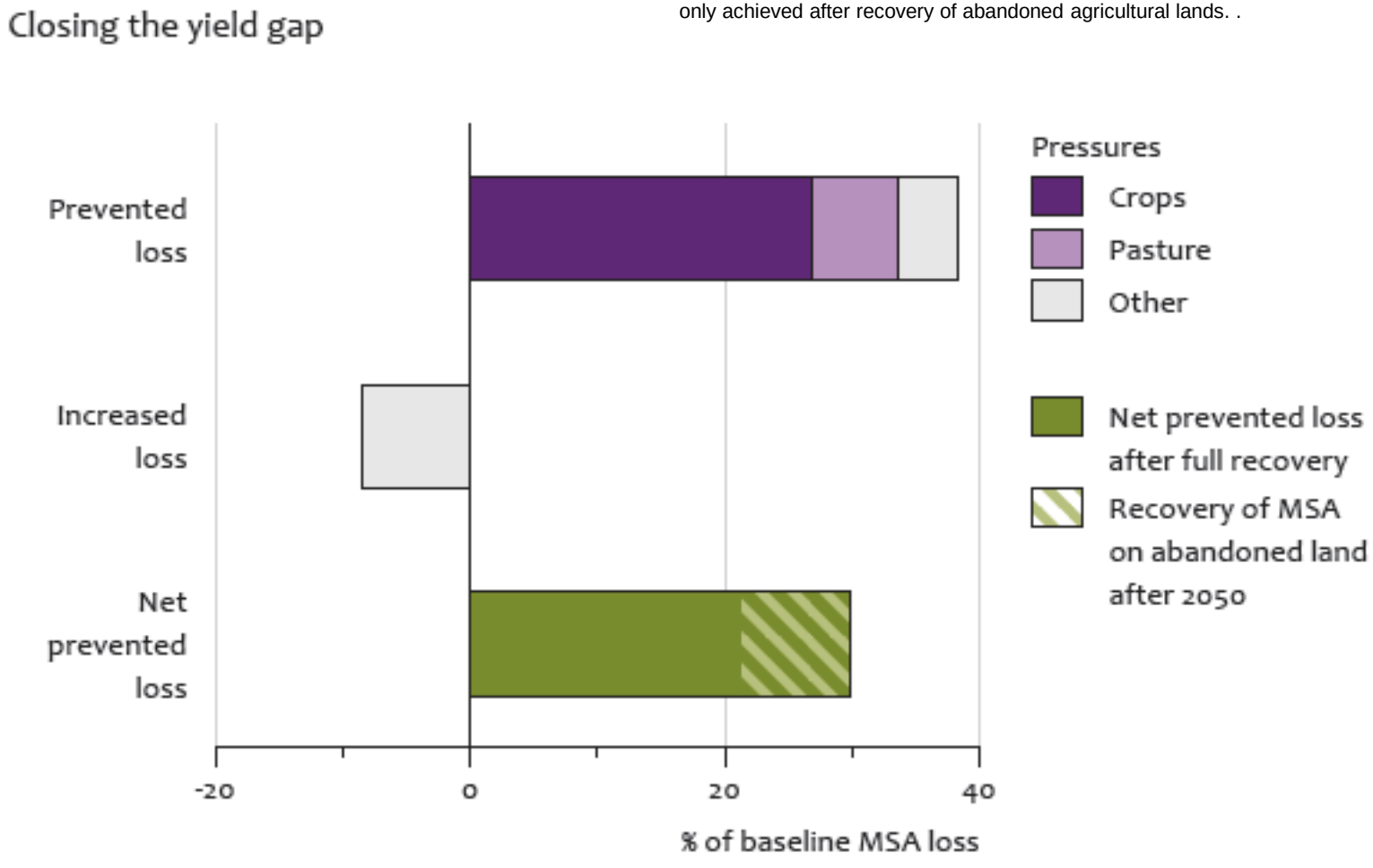
2. Metsade hävimise vähendamine



As the option prevents conversion of densely forested areas, it results in a smaller increase in land use for crops and pasture than projected in the baseline (around 1.5 million km_2 or one third less than the projected baseline increase in 2030; Figure 4.6). This is caused by increased land scarcity due to forest protection, which results in higher land prices, translating into higher commodity prices, higher yield increase and reduced consumption. As less timber is coming from logging for agriculture, more dedicated forestry is needed, resulting in a larger forestry area

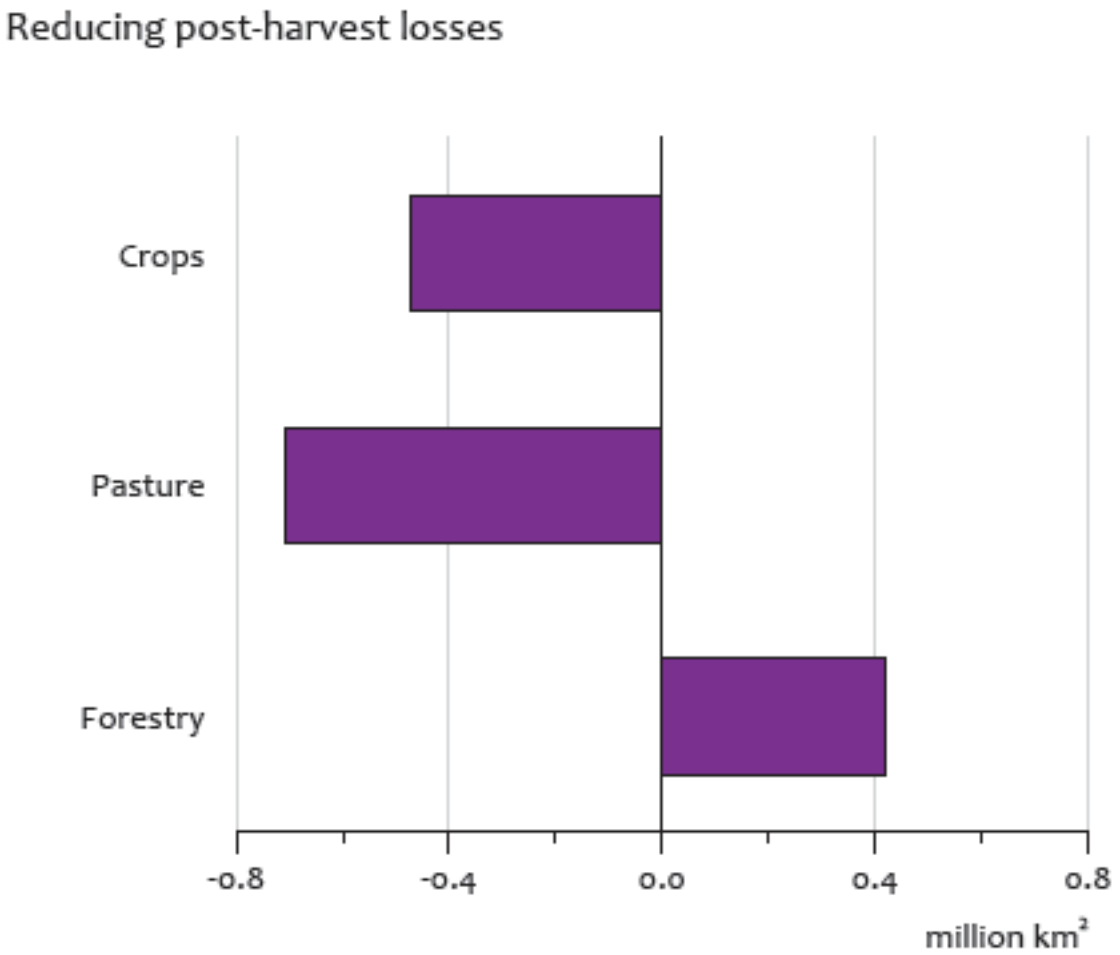
3. Saagikus

Improved agricultural yields can prevent about 30% of MSA loss by 2050, but part of this is only achieved after recovery of abandoned agricultural lands. .



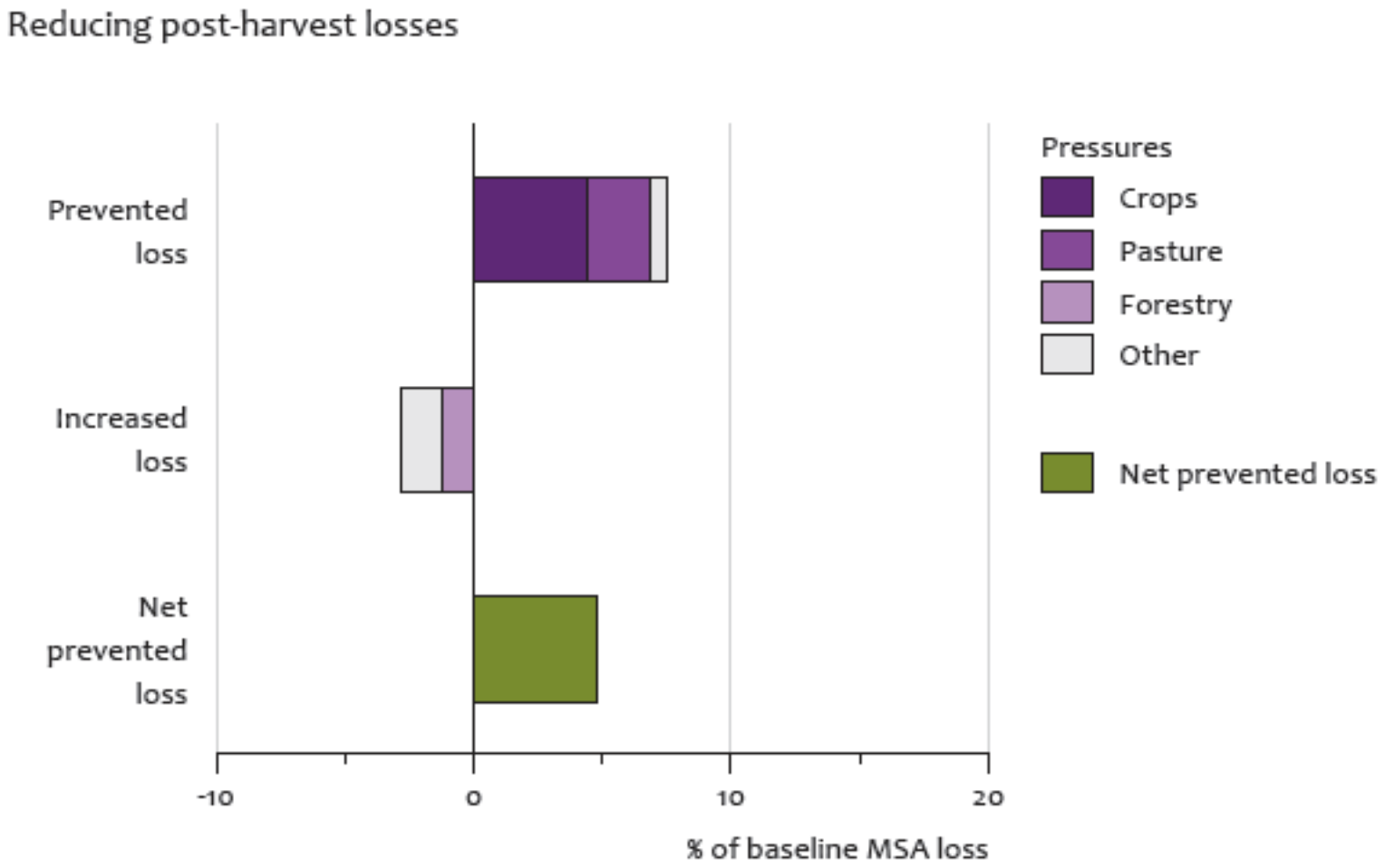
- An increase in agricultural productivity is required if biodiversity preservation, food security and rural livelihoods are to be improved simultaneously.
- Improving yields 40% faster than the trend would reduce agricultural land use by more than 6 million km^2 by 2050, allowing cattle grazing areas to revert to natural habitats. In terms of MSA, this option would prevent over 20% of baseline loss by 2050.
- The largest reductions in projected biodiversity losses can be achieved in temperate and tropical grassland biom

4. Toidu käitlemise kaod



When post-harvest losses are reduced, less land is required for crops and pasture by 2050. This also results in less agricultural expansion into forested areas, a process from which wood is usually obtained. This would lead to more regular forestry (see Box 5.1).

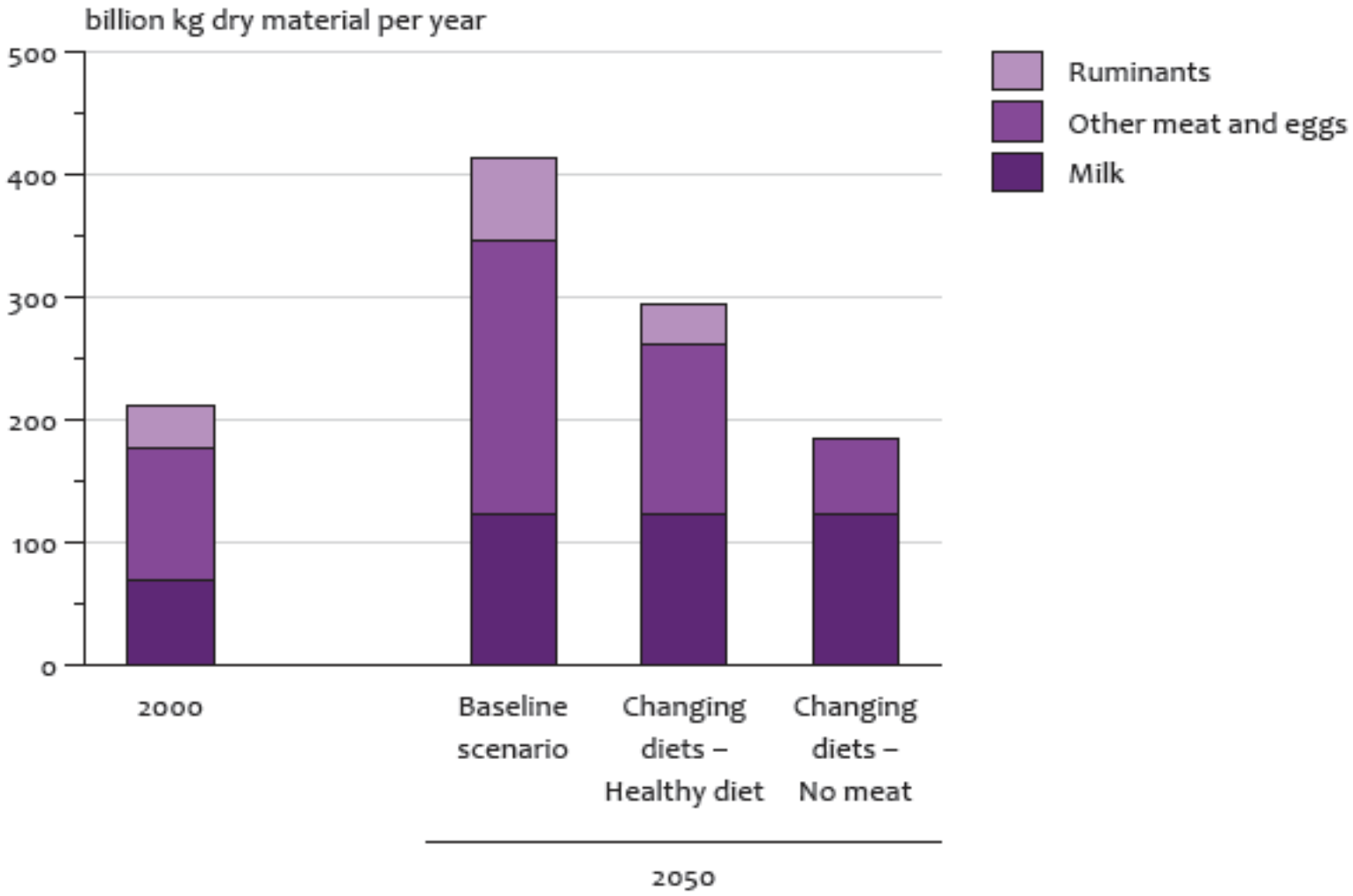
4. Toidu käitlemise kaod



The prevented MSA loss from reducing post-harvest losses is modest and results mostly from reduced land-use for crops and pasture.

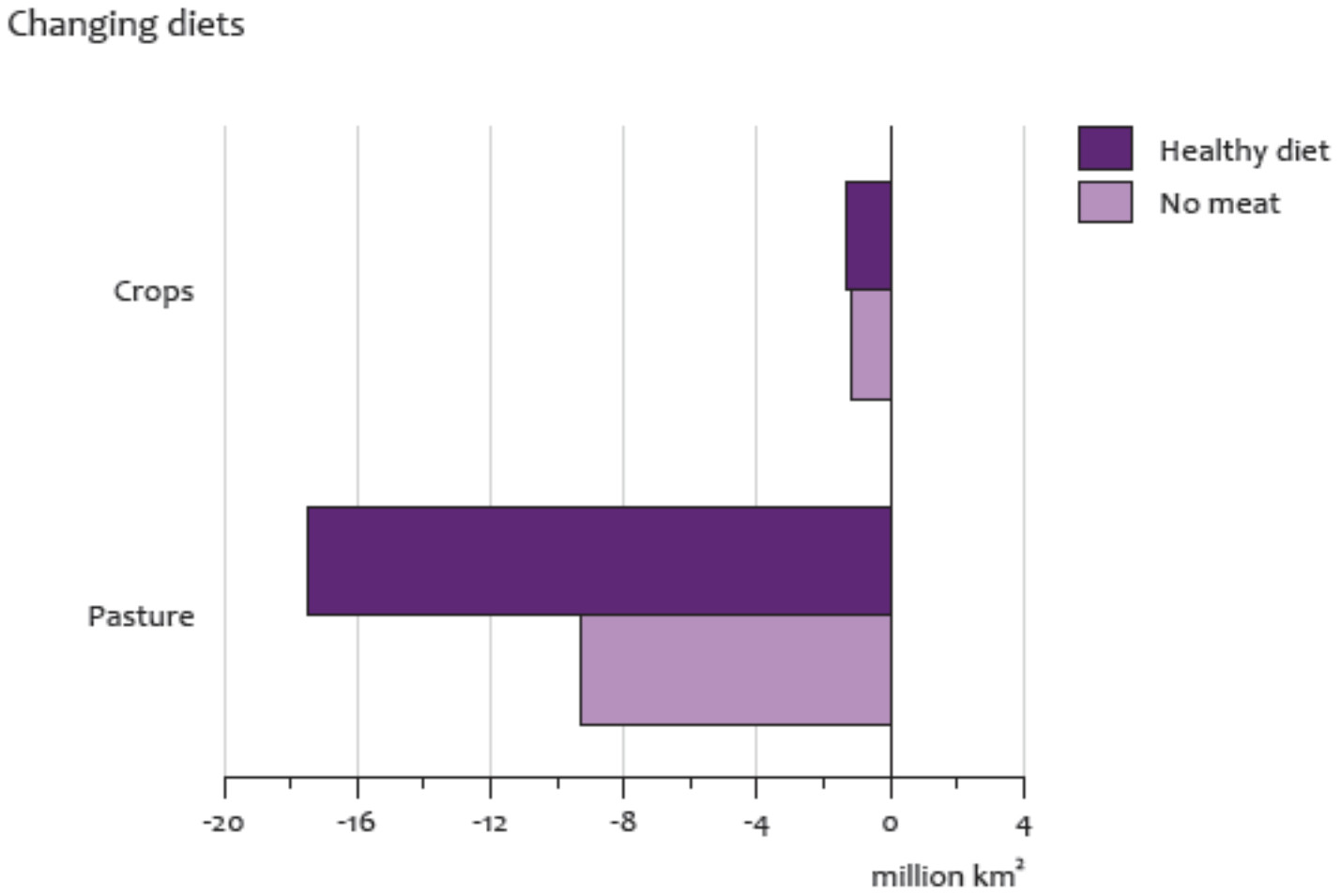
Foto Piret Eensoo

5. Toitumisharjumuste muutmine

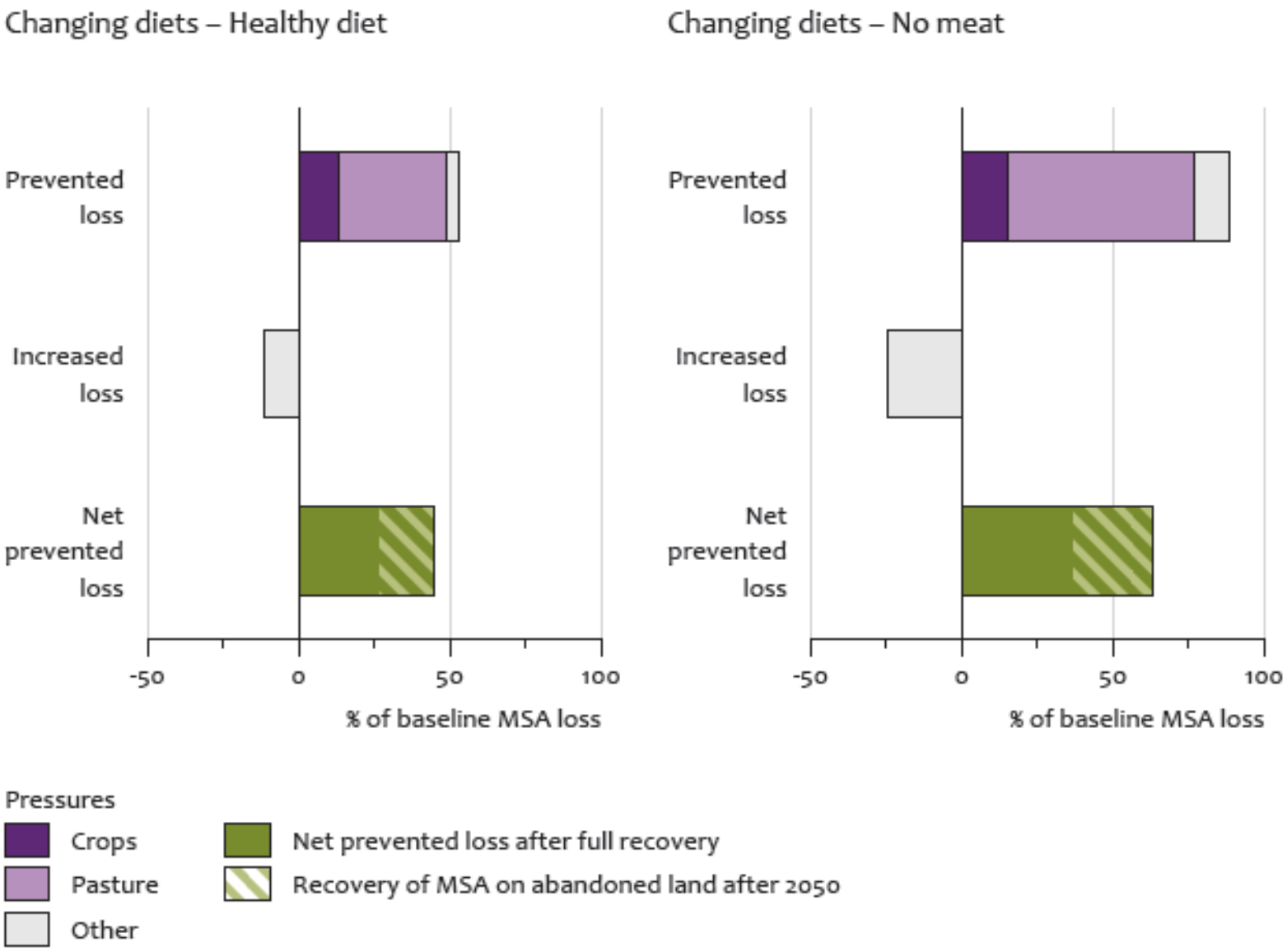


Changing diets to less meat consumption would significantly reduce livestock production by 2050.

5. Toitumisharjumuste muutmine



5. Toitumisharjumuste muutmine

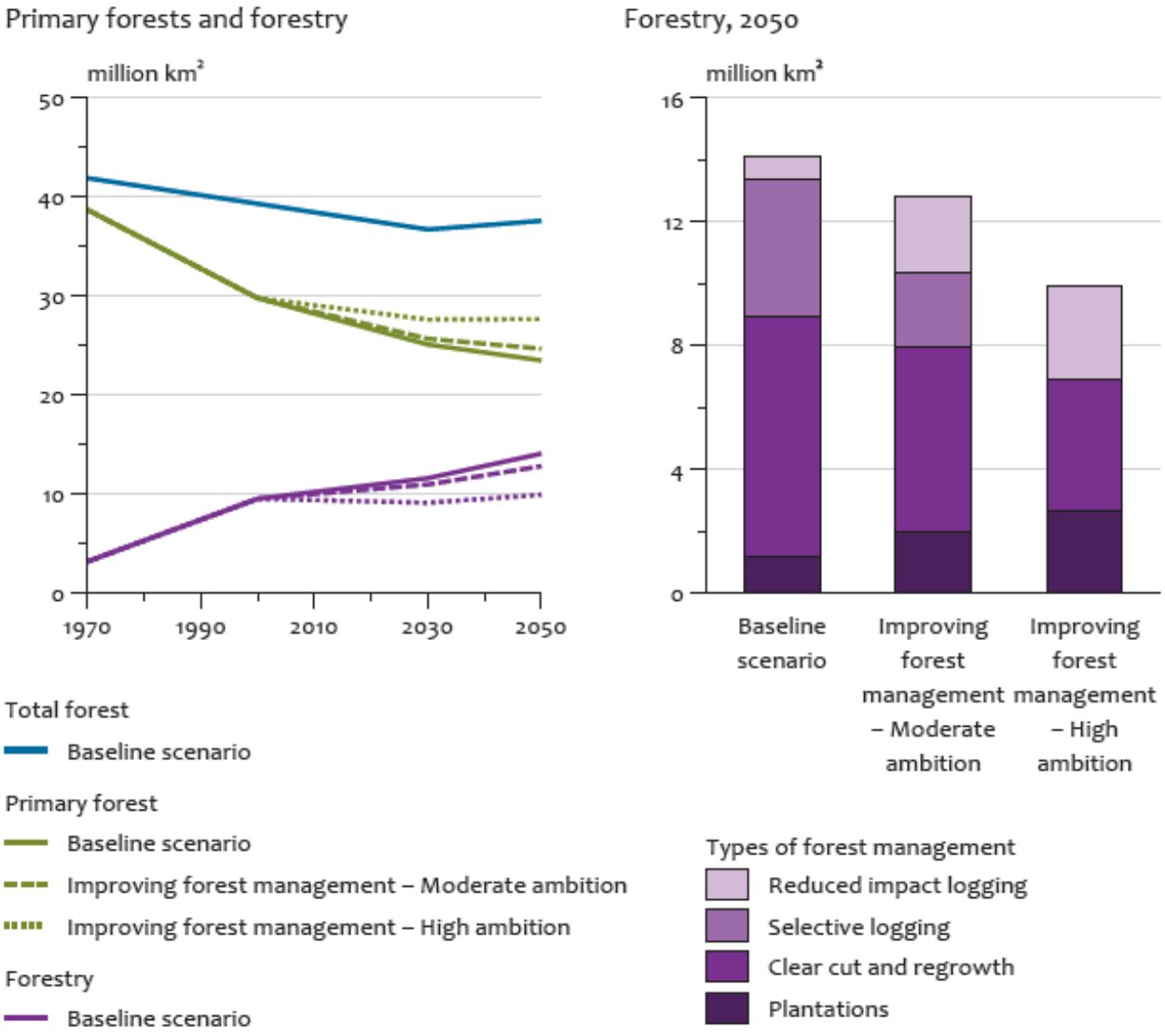


Net prevented MSA loss from changing diets is significant, but is partly achieved only after 2050 because time is needed for abandoned lands to recover to a more natural state.

6. Metsamajanduse kaasajastamine

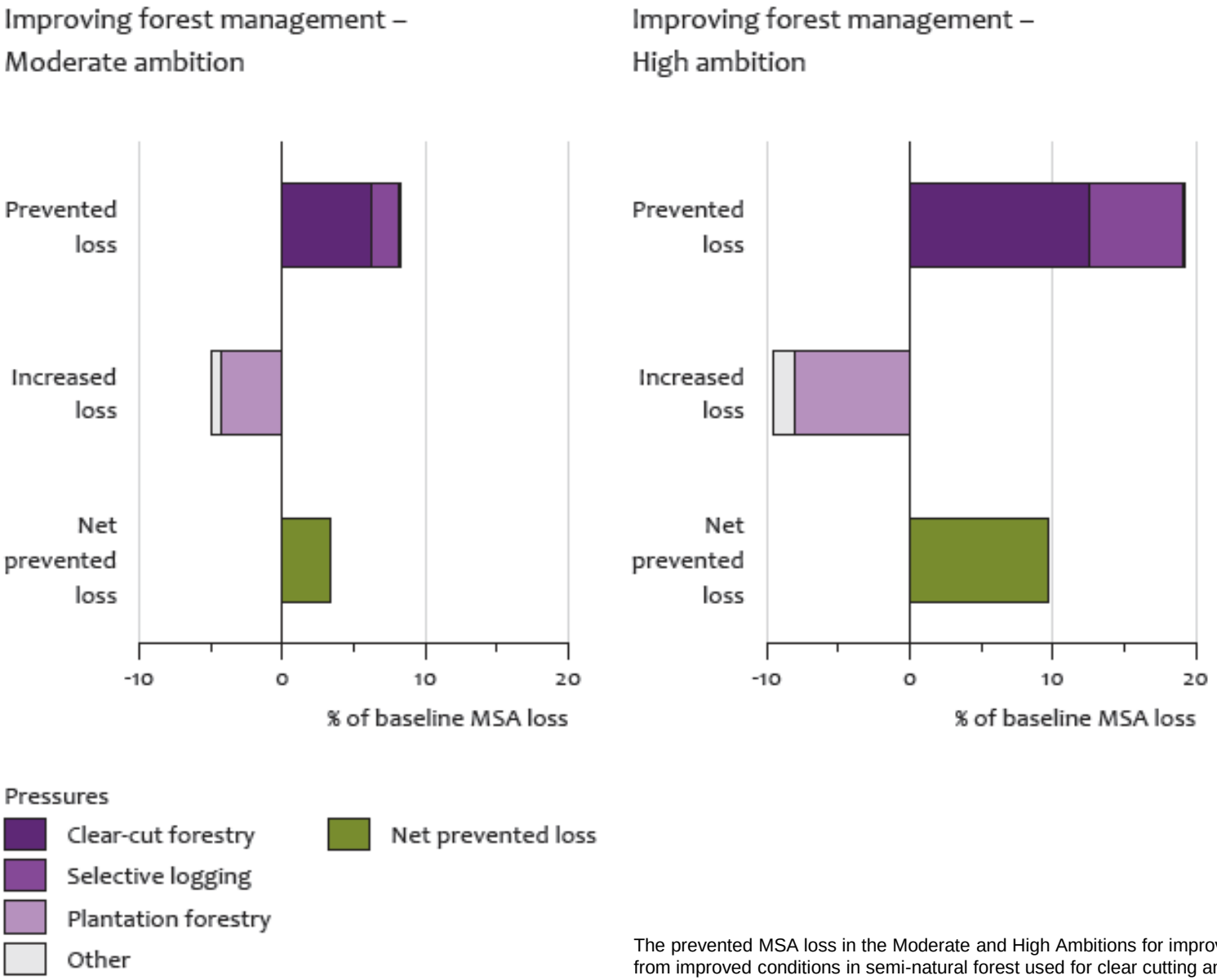
- Establishing highly productive forest plantations can lower the pressures of logging on semi-natural forests. This would reduce loss of primary forest area and total forest biodiversity loss may be reduced, especially where plantations can be established without affecting natural forests.
- Reduced impact logging (RIL) may increase biodiversity in timber-producing semi-natural forests, especially in the tropics. RIL also provides a modest increase in the total carbon storage and better forest recovery.
- Plantations are efficient for producing wood but have relatively low biodiversity value. The availability of abandoned agricultural land for plantations largely determines the net biodiversity effect. This factor is external to the forestry sector.

6. Metsamajanduse kaasajastamine



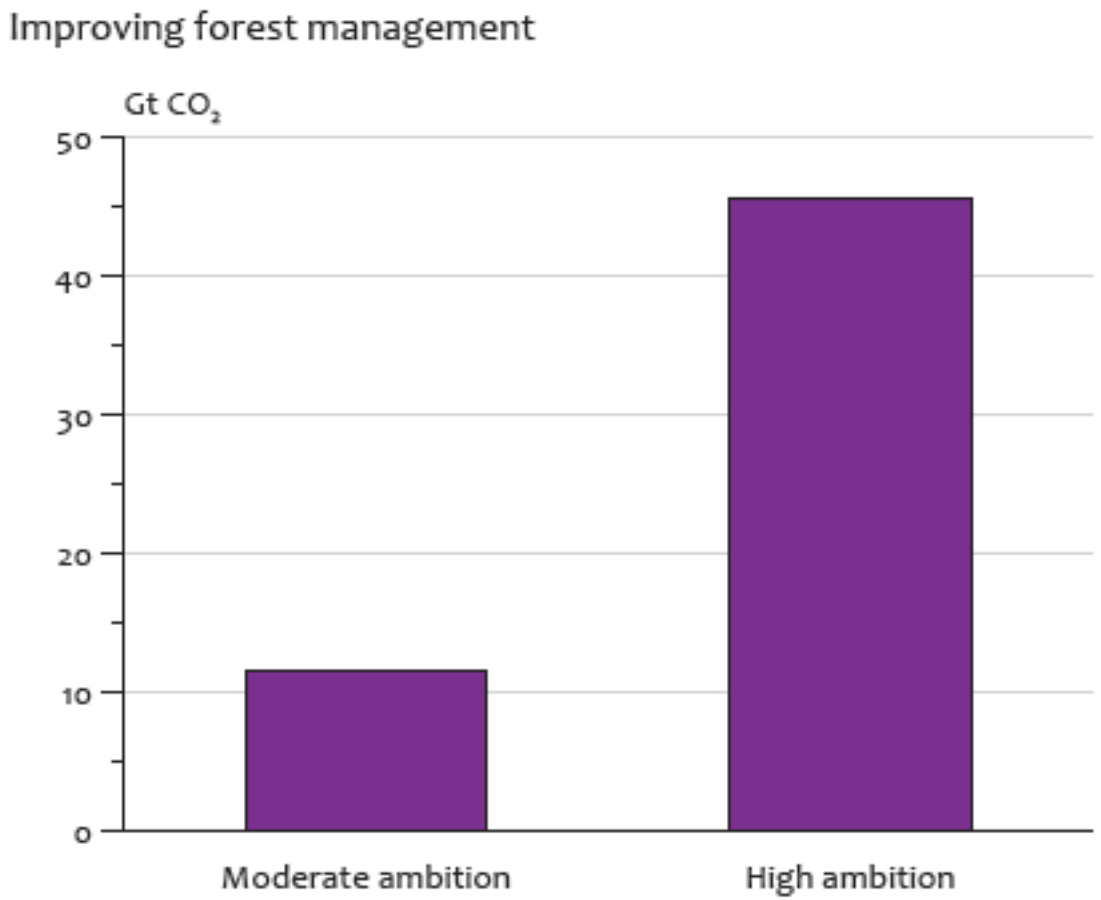
The two improved forestry options have different proportions of forest management types compared to the baseline scenario for 2050. In these options, the area of unused forest increases relative to the baseline.

6. Metsamajanduse kaasajastamine



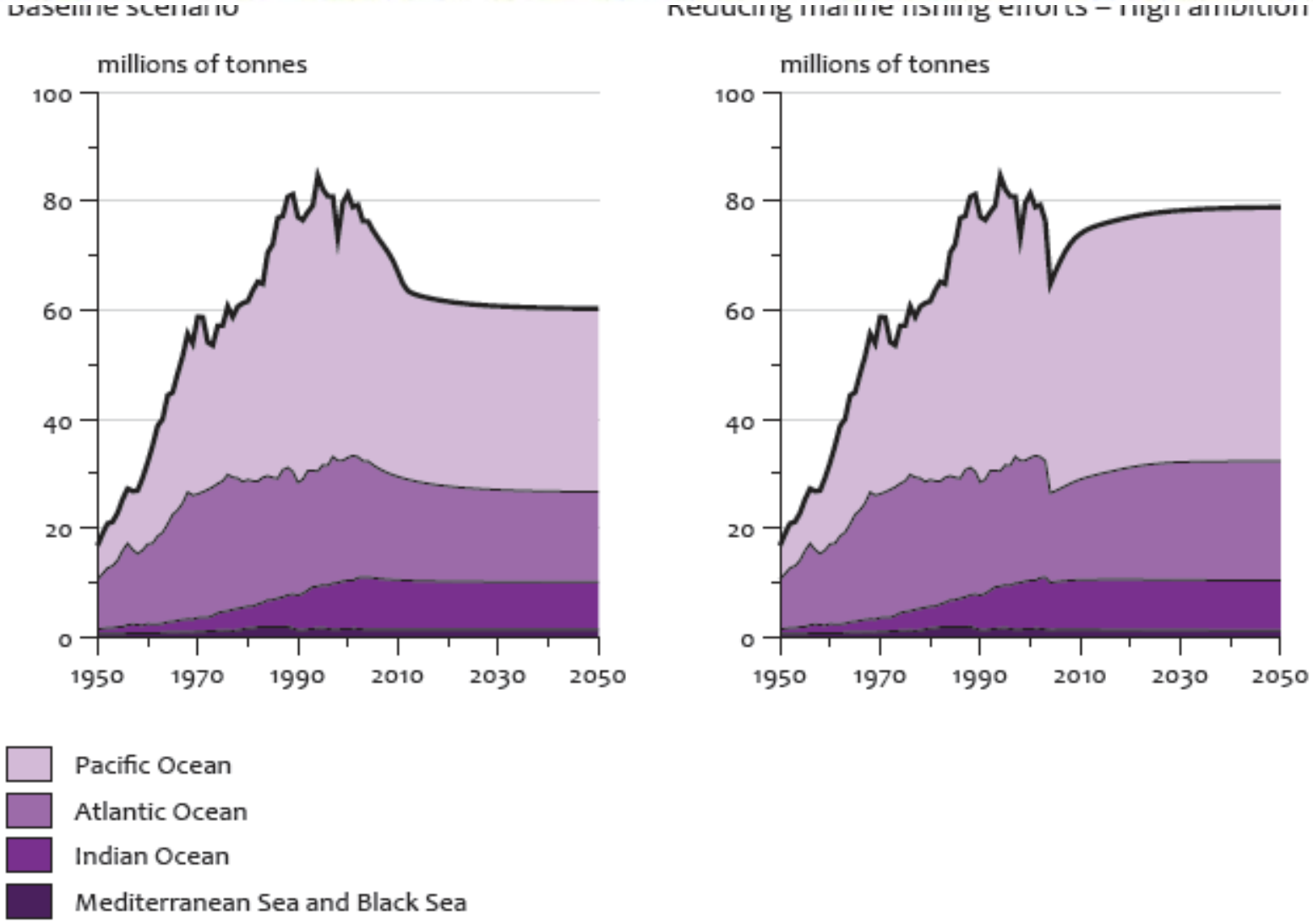
The prevented MSA loss in the Moderate and High Ambitions for improved forestry results from improved conditions in semi-natural forest used for clear cutting and selective logging. Establishing forest plantations leads to additional MSA loss.

6. Metsamajanduse kaasajastamine



Improving forestry management would lead to more carbon stored in living and dead forest biomas.

7. Kalandus - väljapüügi vähendamine

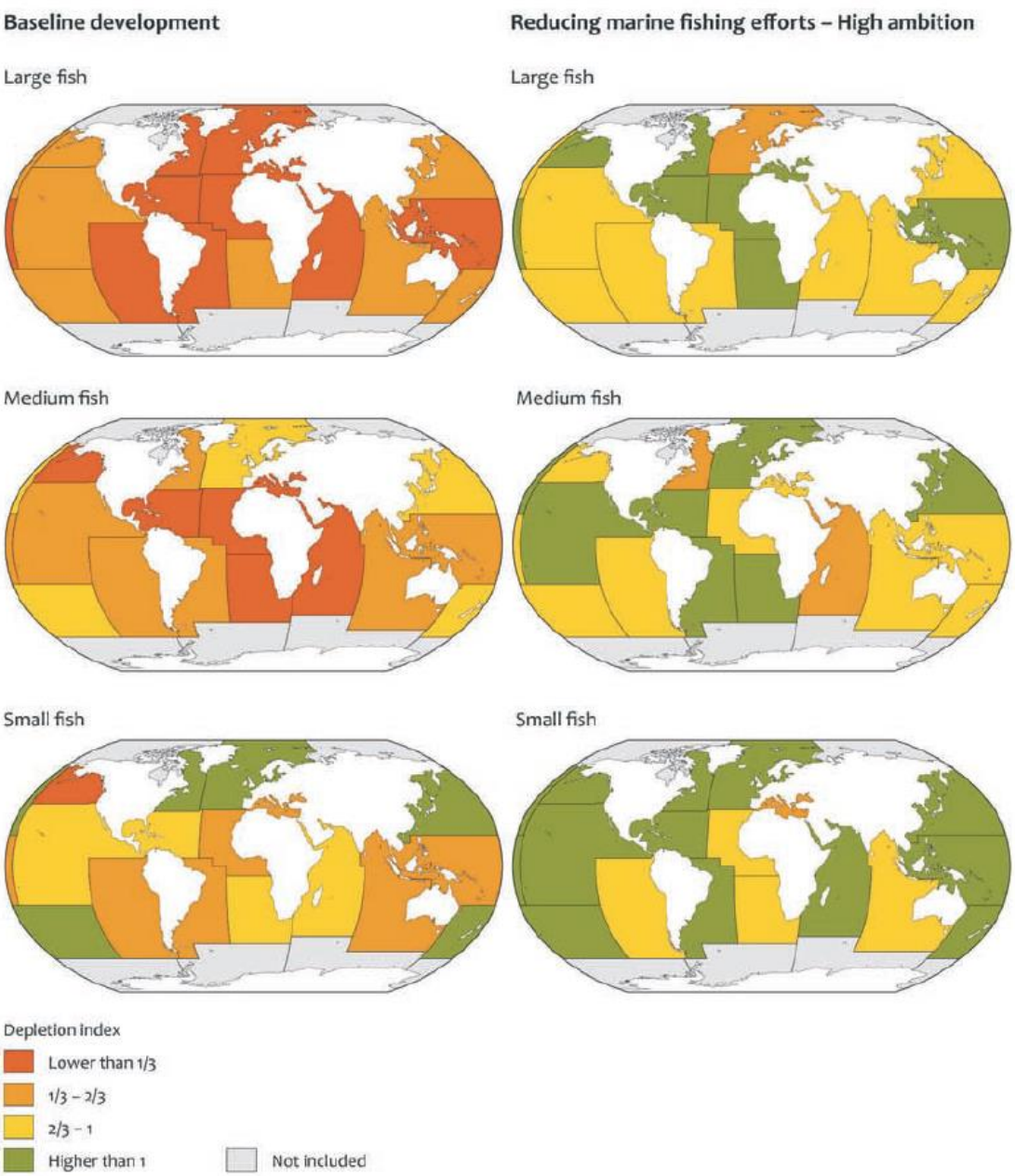


requires immediate
v recovery over the
ó increase in future

t in fish supply would
crops for fish feed,
compared to other agricultural developments explored in this study.

In the baseline, marine catches are lower in 2050. Temporarily reducing the fishing effort would allow marine catches to be restored to higher levels.

7. Kalandus - väljapüügi vähendamine

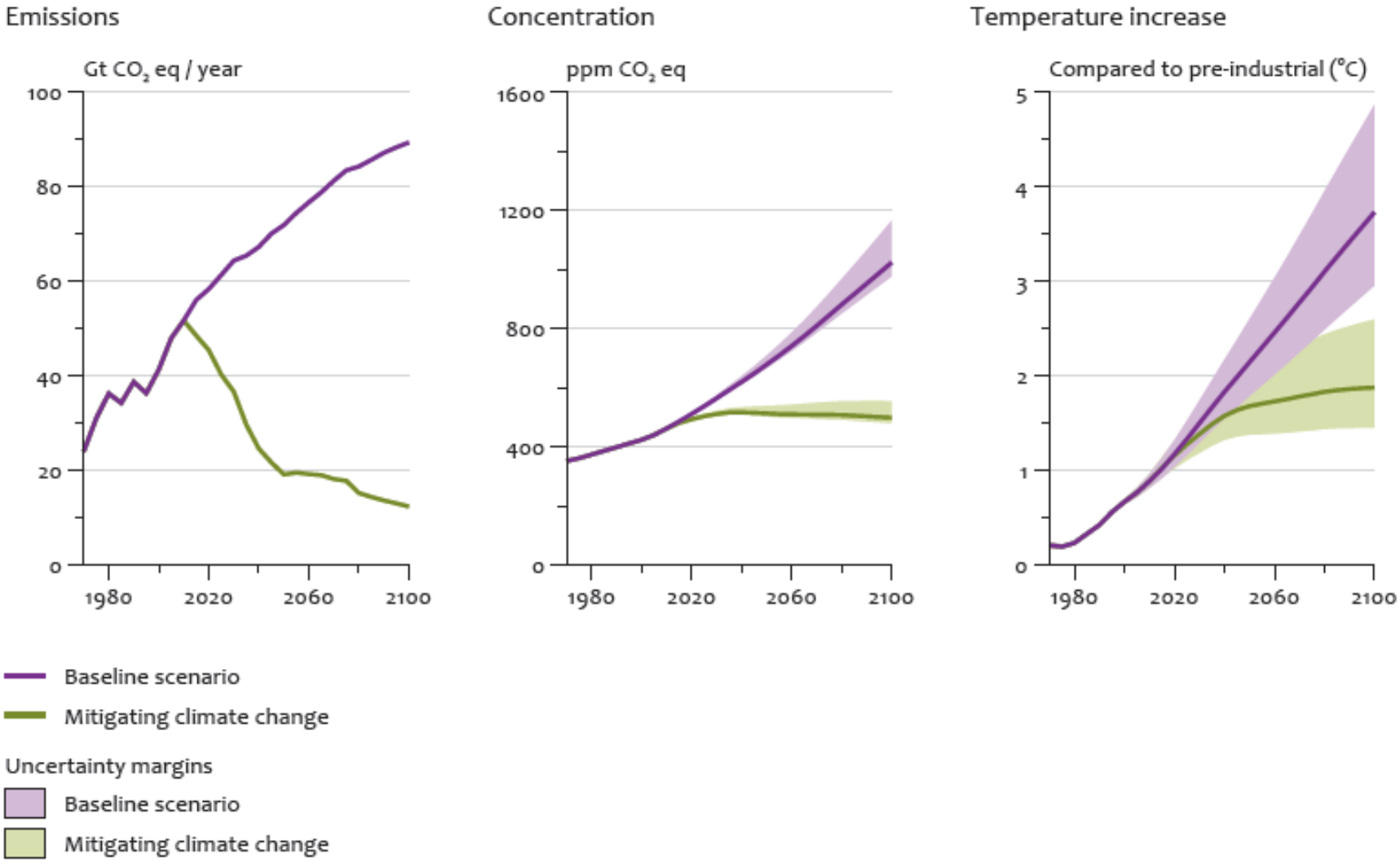


The Marine Depletion Index (weighted stock indicator for fish populati
High Ambition option is higher especially for large and medium-sized

8. Kliimamuutuste leevendamine

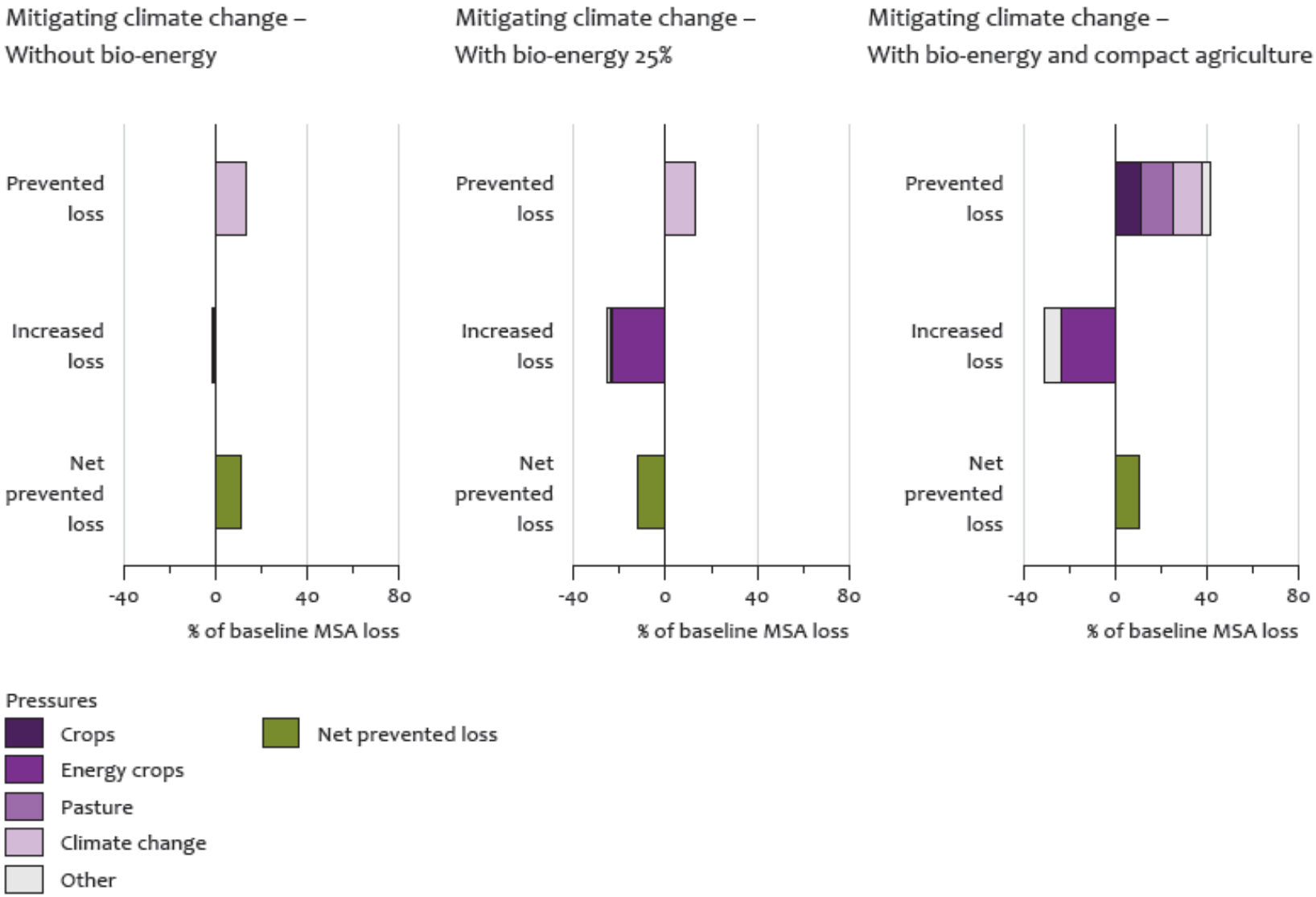
- Climate change is expected to be an increasingly important threat to biodiversity in the future. By 2100 (beyond the study horizon of 2050), average global temperature rise without climate policy might be in the order of 3 to 5 ^{o}C above the pre-industrial level. Stringent climate policy might limit this increase to 2 ^{o}C. In the coming decades, however, the differences between scenarios with and without climate policy are likely to be much smaller.
- Up to 2050, climate change is responsible for about one third of the total projected baseline biodiversity loss. Implementation of stringent climate policy may prevent about 10% of the predicted total biodiversity loss.
- For reducing GHG emissions, leading ultimately to 450 ppm CO_2 atmospheric concentrations, several measures are available (such as energy efficiency, carbon capture and storage, and renewable energy). Bio-energy may also contribute to GHG emission reduction, but scenario analysis shows that this measure might involve trade-offs with biodiversity because most bio-energy crops require land and water.
- The net impact of climate policy with bio-energy (prevented climate change versus negative land use impacts) depends on the type of bio-energy used and the period considered. The impacts on biodiversity of land-intensive crops are high; impacts of using residues (agriculture or forestry), second generation bio-energy or use of degraded lands are much lower. Several factors influence the net results and its uncertainty, such as climate change sensitivity, bioenergy production efficiency, and also feedbacks of increasing land scarcity on agricultural productivity.
- To minimise or reduce biodiversity loss through bio-energy use, strict biodiversity criteria need to be applied to bio-energy (beyond those already included in legislation), and both direct and indirect effects should be monitored.

8. Kliimamuutuste leevendamine



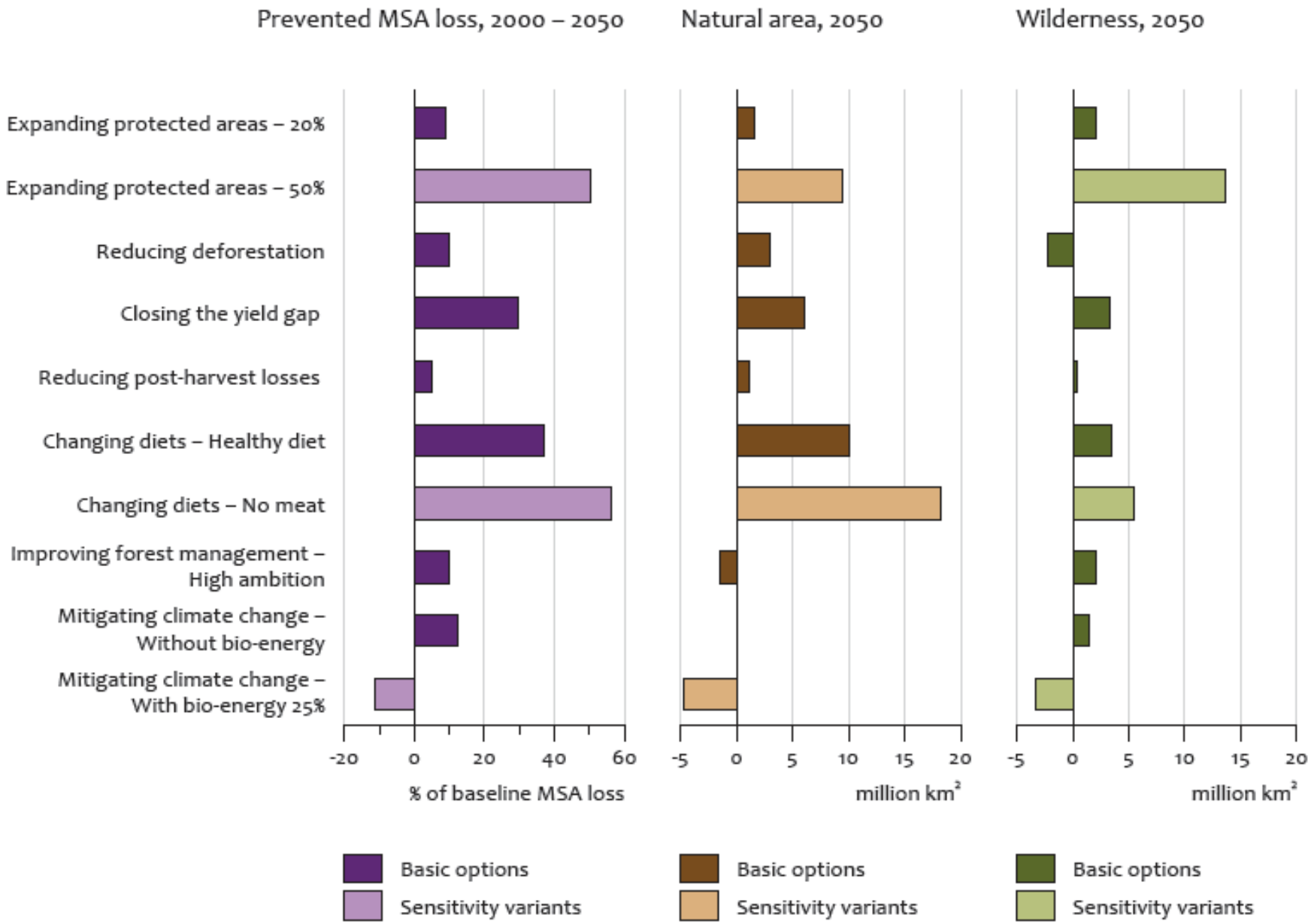
Greenhouse gas emissions can be effectively reduced by means of mitigation policies to lower levels than projected greenhouse gas concentrations and temperature in the baseline. There are considerable uncertainties in future projections of climate change due to uncertainties in the carbon cycle and climate sensitivity (ranges based on van Vuuren et al., 2008).

8. Kliimamuutuste leevendamine



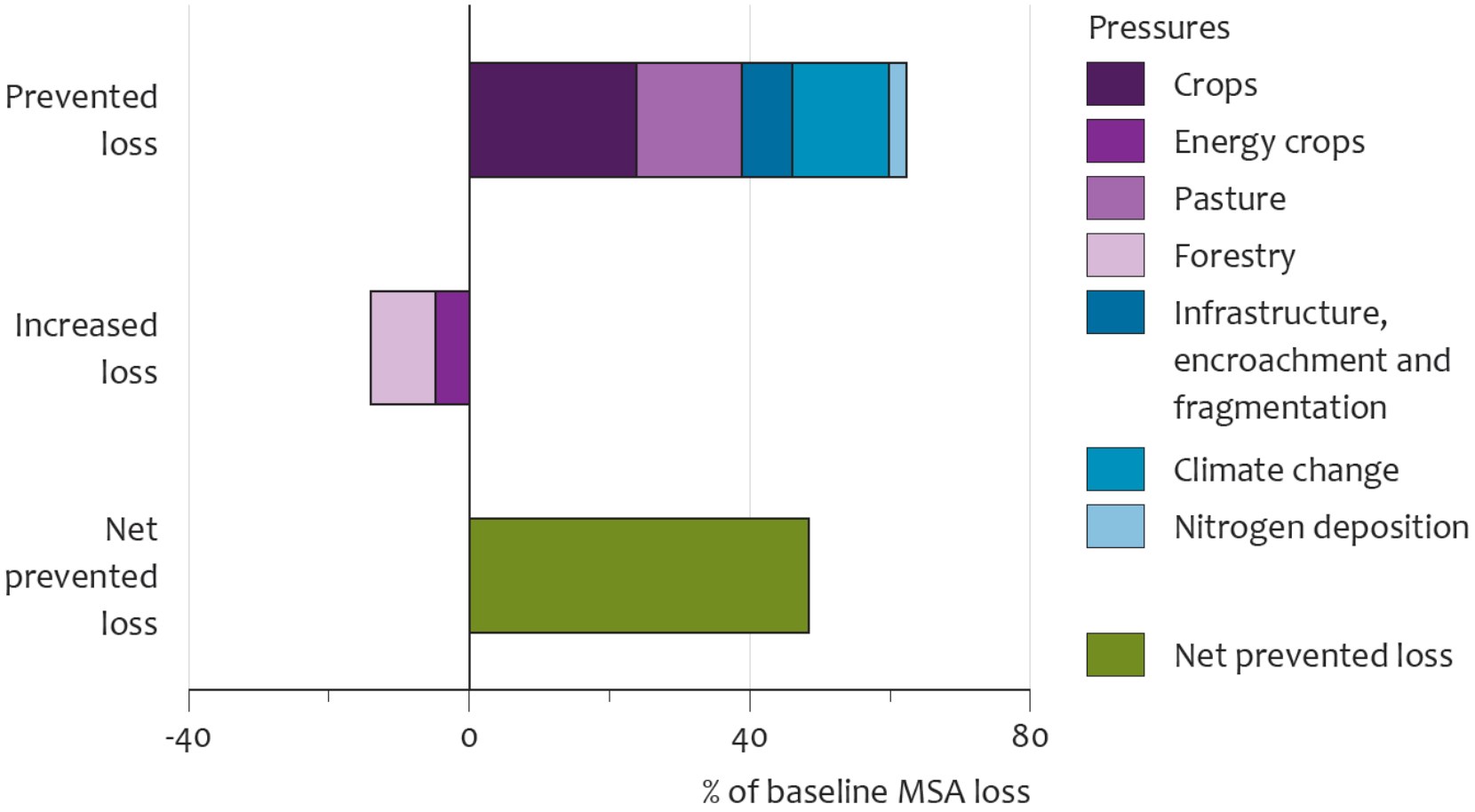
Climate policy can reduce future MSA loss. Large-scale bio-energy use, however, may reverse this trend depending on how it is implemented (energy demand is equal for all options). This trade-off can be minimised with simultaneous improvements in agricultural productivity.

Kokkuvõte


Prevented MSA loss, 2000 – 2050
Natural area, 2050
Wilderness, 2050
Expanding protected areas – 20%
Expanding protected areas – 50%
Reducing deforestation
Closing the yield gap
Reducing post-harvest losses
Changing diets – Healthy diet
Changing diets – No meat
Improving forest management – High ambition
Mitigating climate change – Without bio-energy
Mitigating climate change – With bio-energy 25%
-20 0 20 40 60
% of baseline MSA loss
-5 0 5 10 15 20
million km²
-5 0 5 10 15 20
million km²
Basic options
Sensitivity variants
Basic options
Sensitivity variants
Basic options
Sensitivity variants

Kokkuvõte

Combination of options

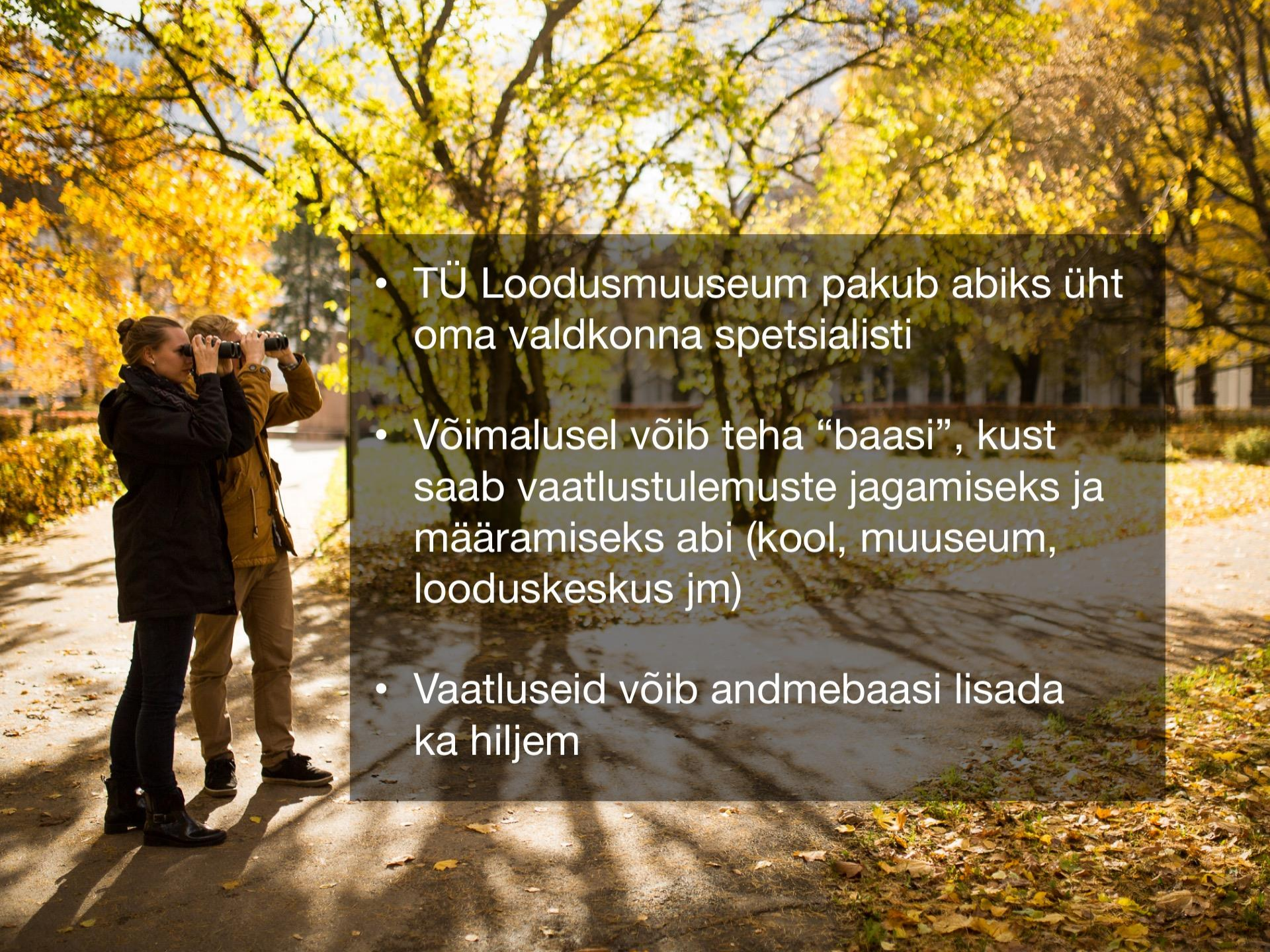


ÜLE-EESTILINE LOODUSVAATLUSTE MARATON 2018

15.-16. JUUNI 2018
KELL 12 KUNI KELL 12

- Loodusvaatlused üle Eesti 24h jooksul
- Formaat – BioBlitz
  (saanud alguse USA-st)
- Kindlaks määratud vaatlusalad kodukohas
- Vaadelda võib omapäi või õpetaja, juhendaja või teadlasega

- Vaatlused salvestatakse foto, video- või heliklipina
- Salvestamiseks nutitelefon, nutivahend või kaamera, võib ka paberil
- Abiks vaatluste äpid
  Minu Loodusheli, Legulus, ODK jt
- Andmed salvestatakse eElurikkuse portaali



- TÜ Loodusmuuseum pakub abiks üht oma valdkonna spetsialisti
- Võimalusel võib teha “baasi”, kust saab vaatlustulemuste jagamiseks ja määramiseks abi (kool, muuseum, looduskeskus jm)
- Vaatluseid võib andmebaasi lisada ka hiljem

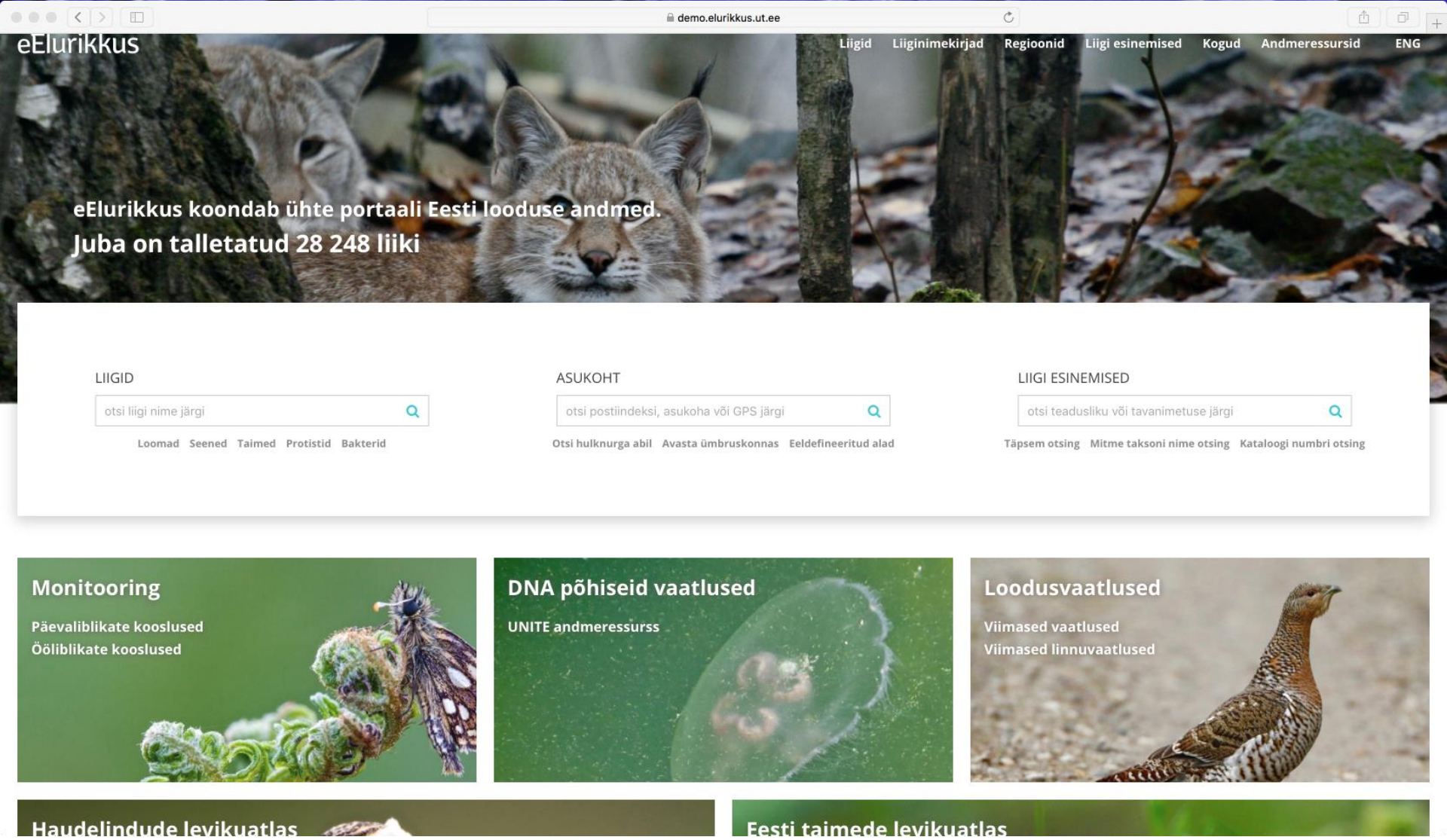
KONTAKT

Märt Kose
m2rtkose@ut.ee
+372 5660 4659

Veljo Runnel
veljo.runnel@ut.ee
+372 520 6108

Tartu Ülikooli Loodusmuuseum

Tartu Ülikooli Botaanikaaed



https://demo.elurikkus.ut.ee

Tänan!

https://demo.elurikkus.ut.ee