

Future of NTFP's – from production to applications and markets

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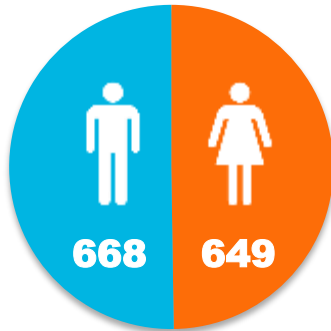
NTFP's and bioeconomy

28.11.2017 Rovaniemi



**We are
Luke**

Personnel



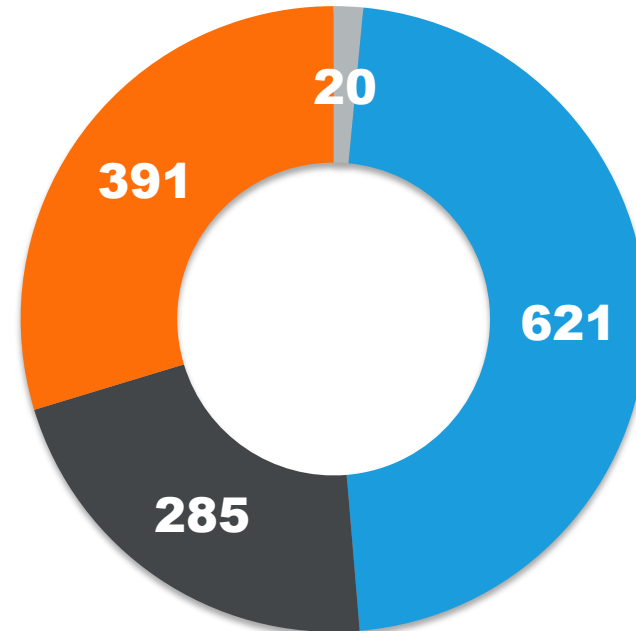
1317
Employees

27%
Doctoral degree

51
Professors

51
Average age, y

Personnel groups



- Directorate 20
- Scientists 621
- Other experts 285
- Research support personnel 391

December 2016

Luke is located throughout Finland

Locations

Helsinki ja Espoo, Jokioinen, Joensuu, Oulu, Turku, Jyväskylä, Seinäjoki, Kokkola, Maaninka (Kuopio), Paltamo, Rovaniemi

Experimental stations

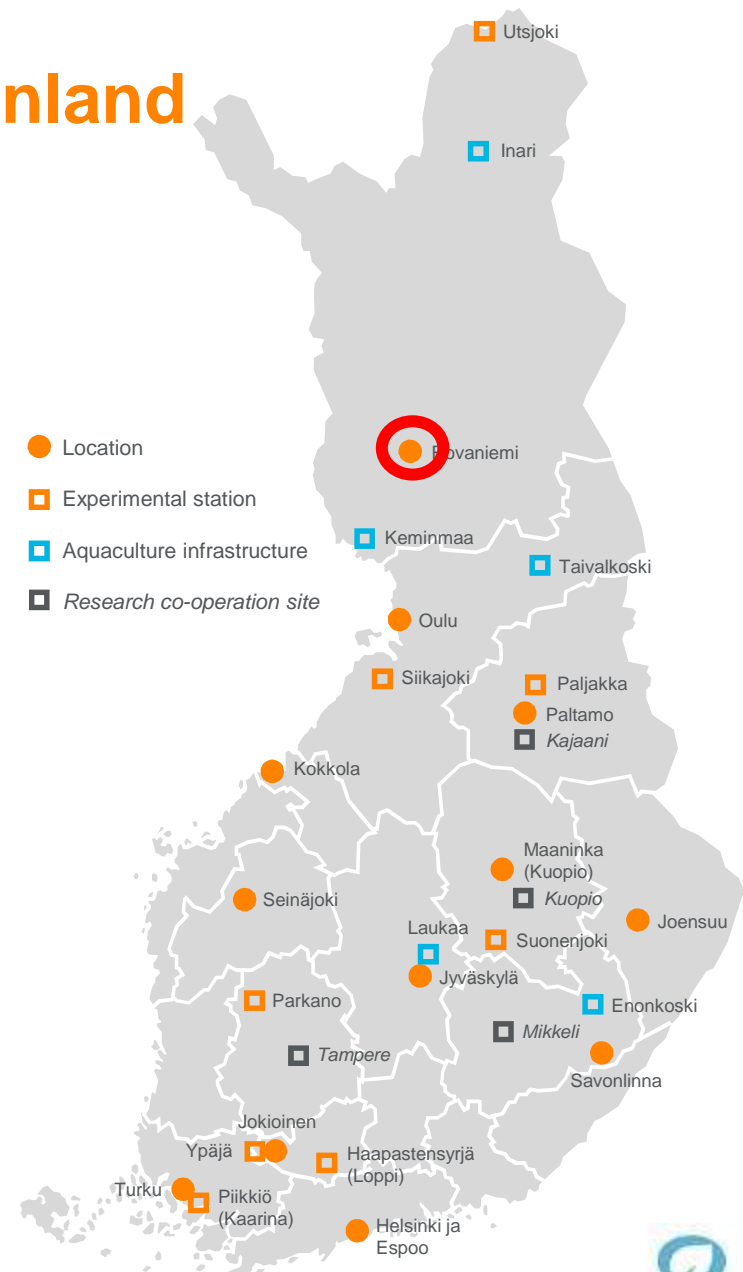
Piikkiö, Haapastensyrjä, Ypäjä, Parkano, Savonlinna, Suonenjoki, Paljakka, Siikajoki, Utsjoki

Aquaculture infrastructure

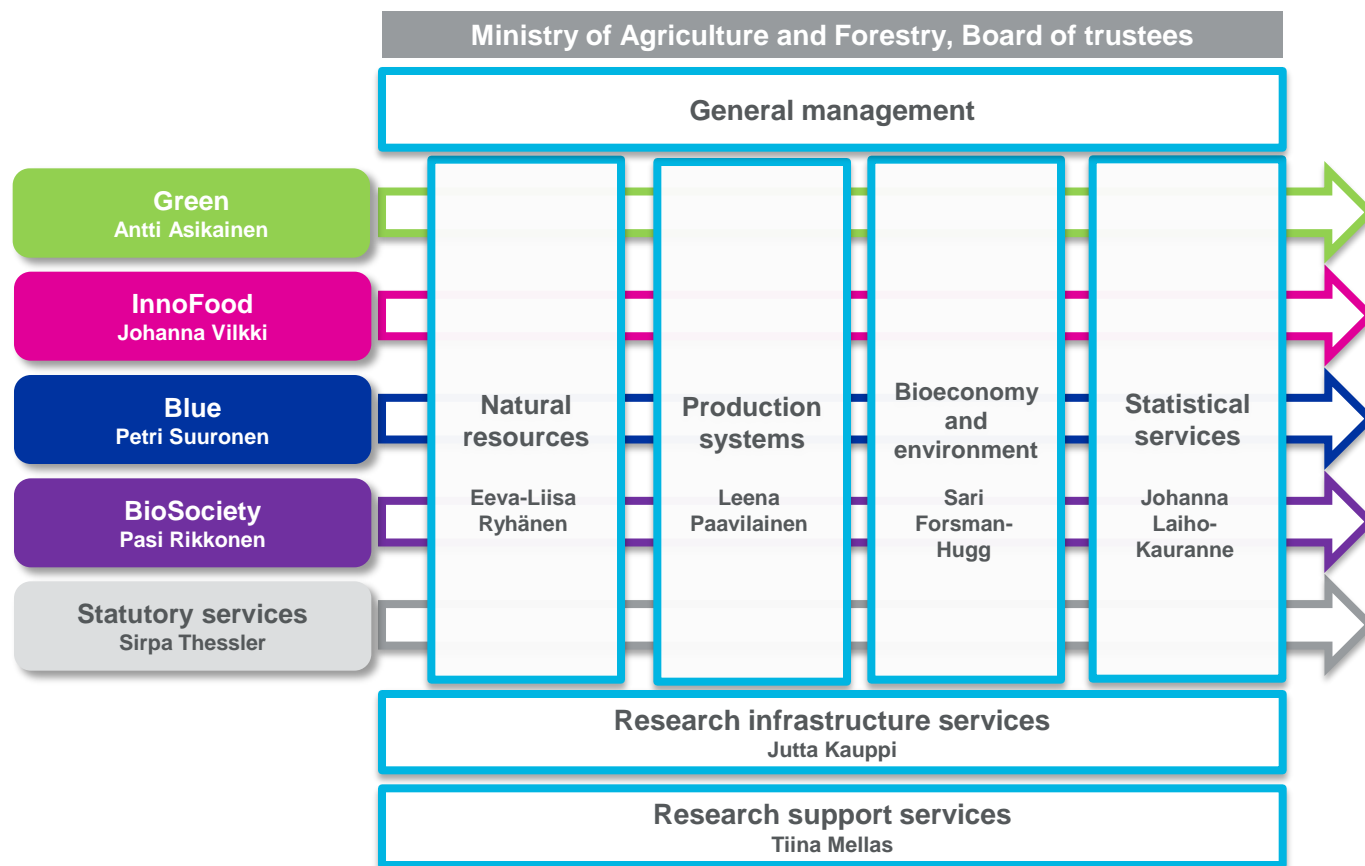
Enonkoski, Laukaa, Taivalkoski, Keminmaa, Inari

Research co-operation sites

Tampere, Mikkeli, Kajaani, Kuopio campus



Luke Natural Resources Institute Finland



120 M€

Turnover

90 M€

Research & customer portfolio

30 M€

Statutory services

25

Locations in Finland

HQ in Helsinki

Present in 12 campuses with universities, research institutes and polytechnics

1300

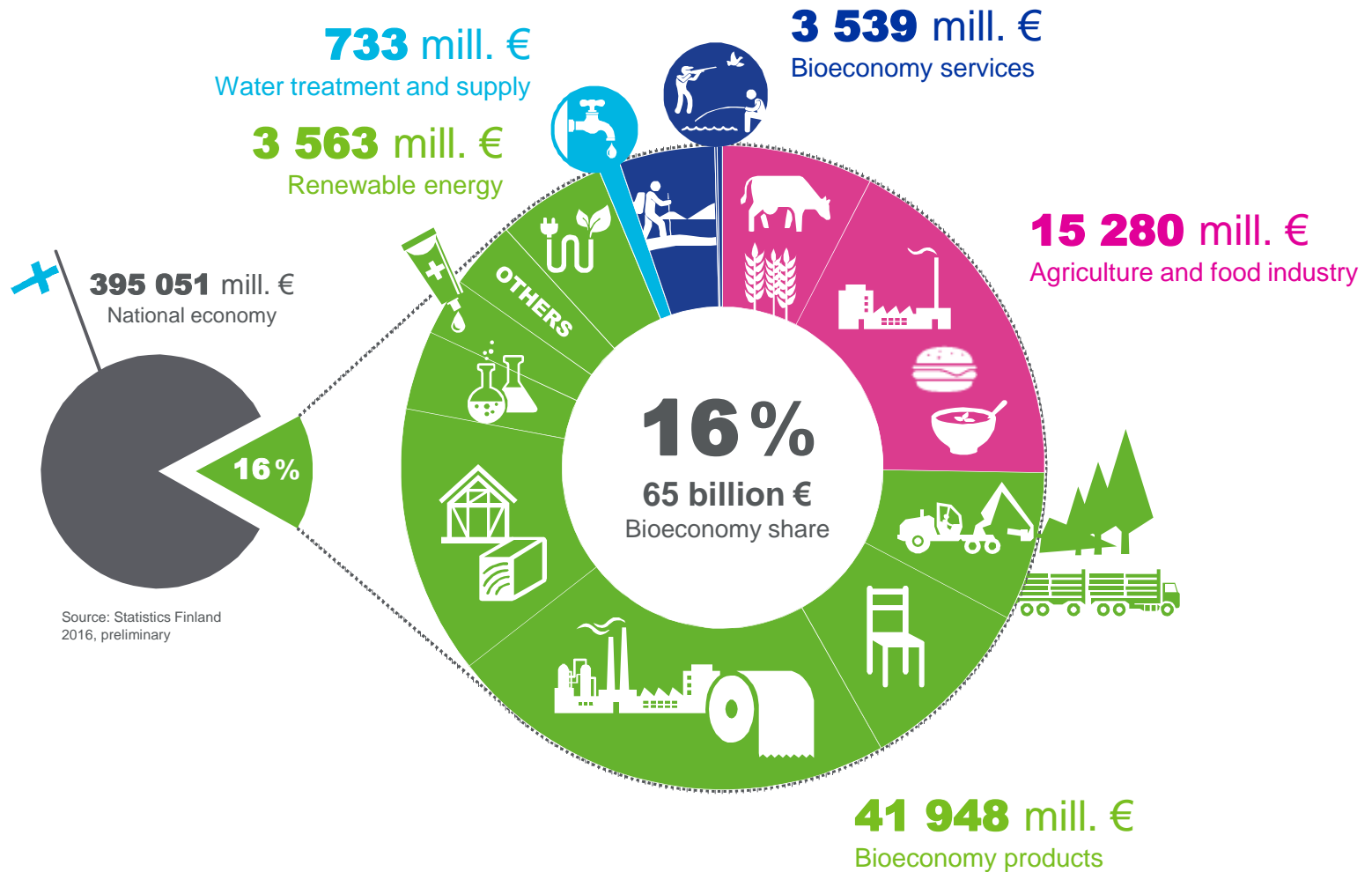
Employees

50 research professors
650 researchers

We are one of the four Statistical Authorities in Finland.

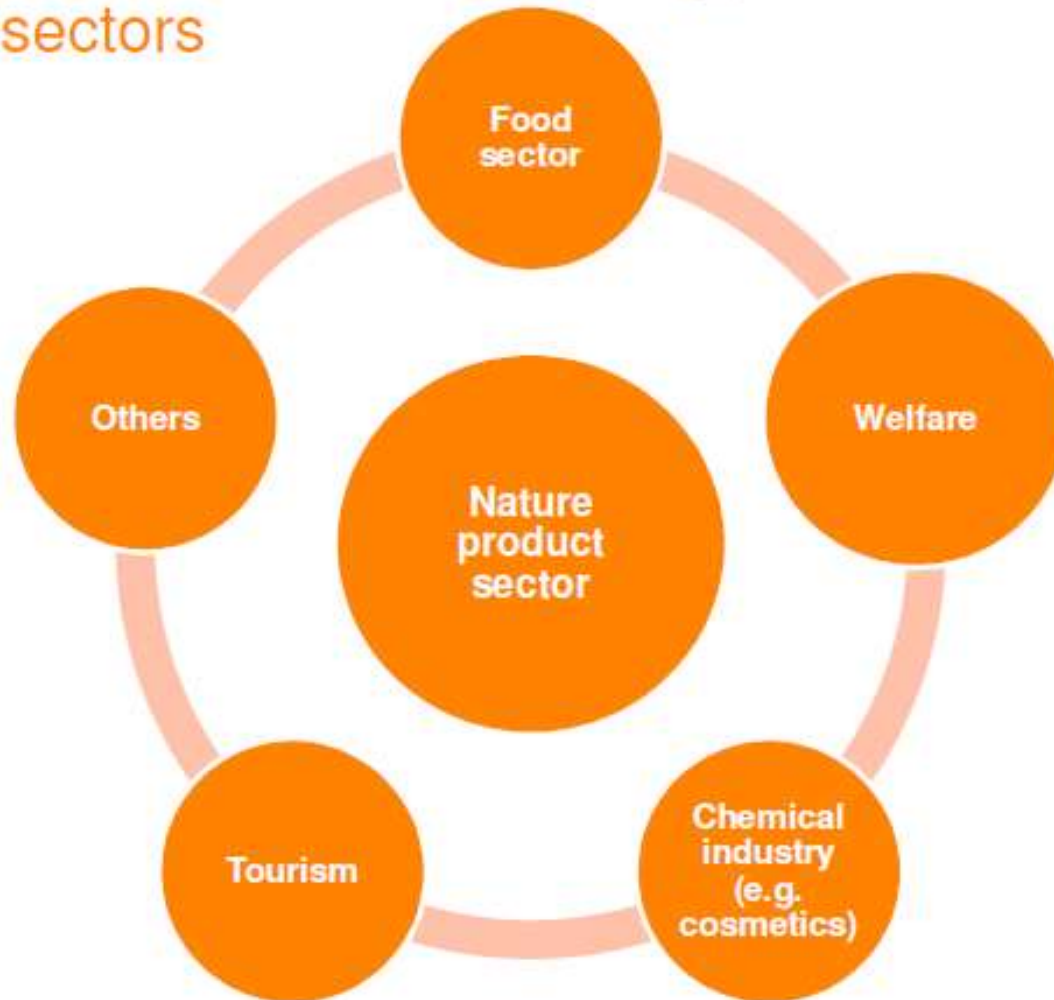
We contribute for the European Statistical System and for the international statistical framework for the UNECE and OECD statistics.

Bioeconomy in Finnish national economy



Graphics: Vihreä biotalous – 100-vuotiaan Suomen hyvinvoinnin ja kilpailukyyn perusta.

Nature product sector is strongly interlinked with other sectors



NTFPs, production and markets

Bilberry (without
cleaning)
1.4 €/kg

Bilberry
(cleaned)
4 €/kg

Dried bilberry
powder
100 €/kg

Bilberry tincture
3500 €/kg

Fate of anthropogenic CO₂ emissions (2007–2016)

Sources = Sinks



34.4 GtCO₂/yr
88%



12%
4.8 GtCO₂/yr



17.2 GtCO₂/yr
46%



30%
11.0 GtCO₂/yr



24%
8.8 GtCO₂/yr

Budget Imbalance:
(the difference between estimated sources & sinks)

6%
2.2 GtCO₂/yr

Global carbon budget

The cumulative contributions to the global carbon budget from 1870
 The carbon imbalance represents the gap in our current understanding of sources and sinks

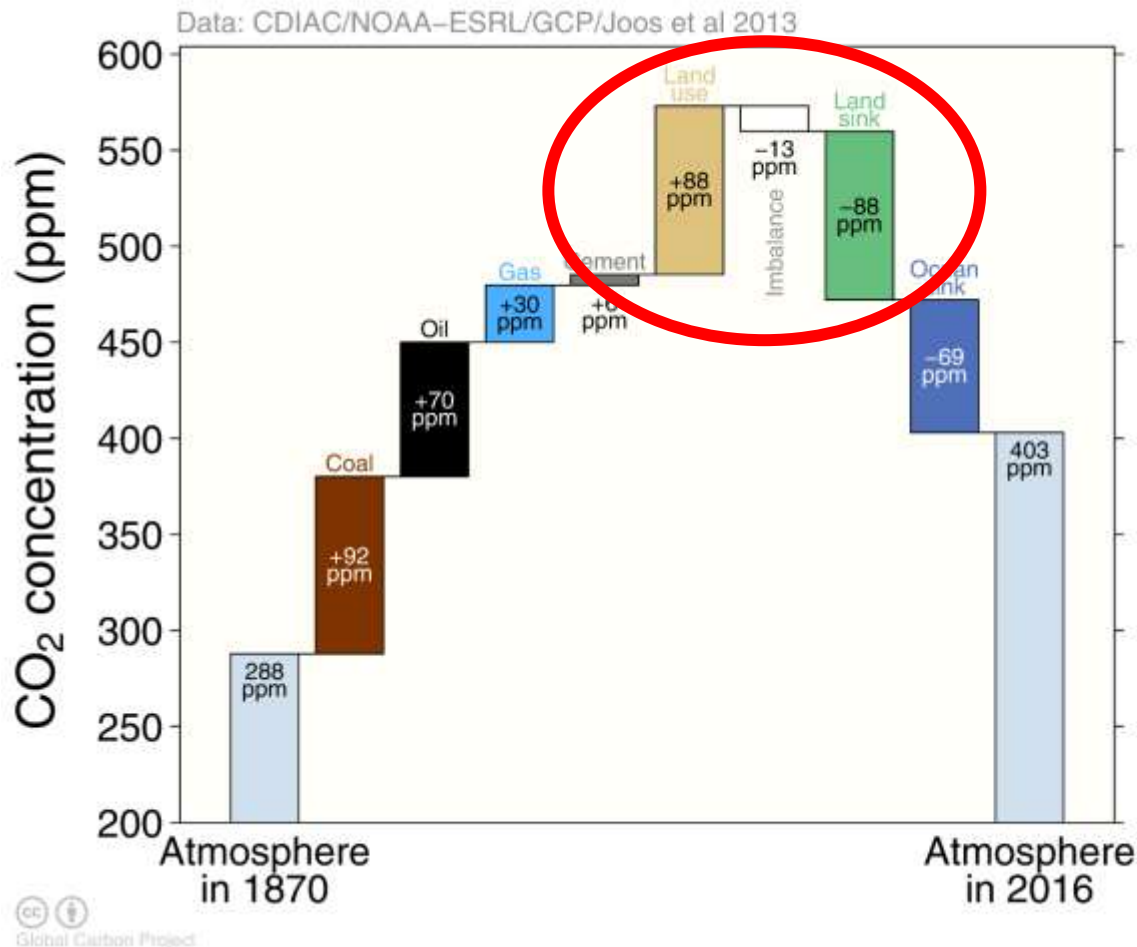
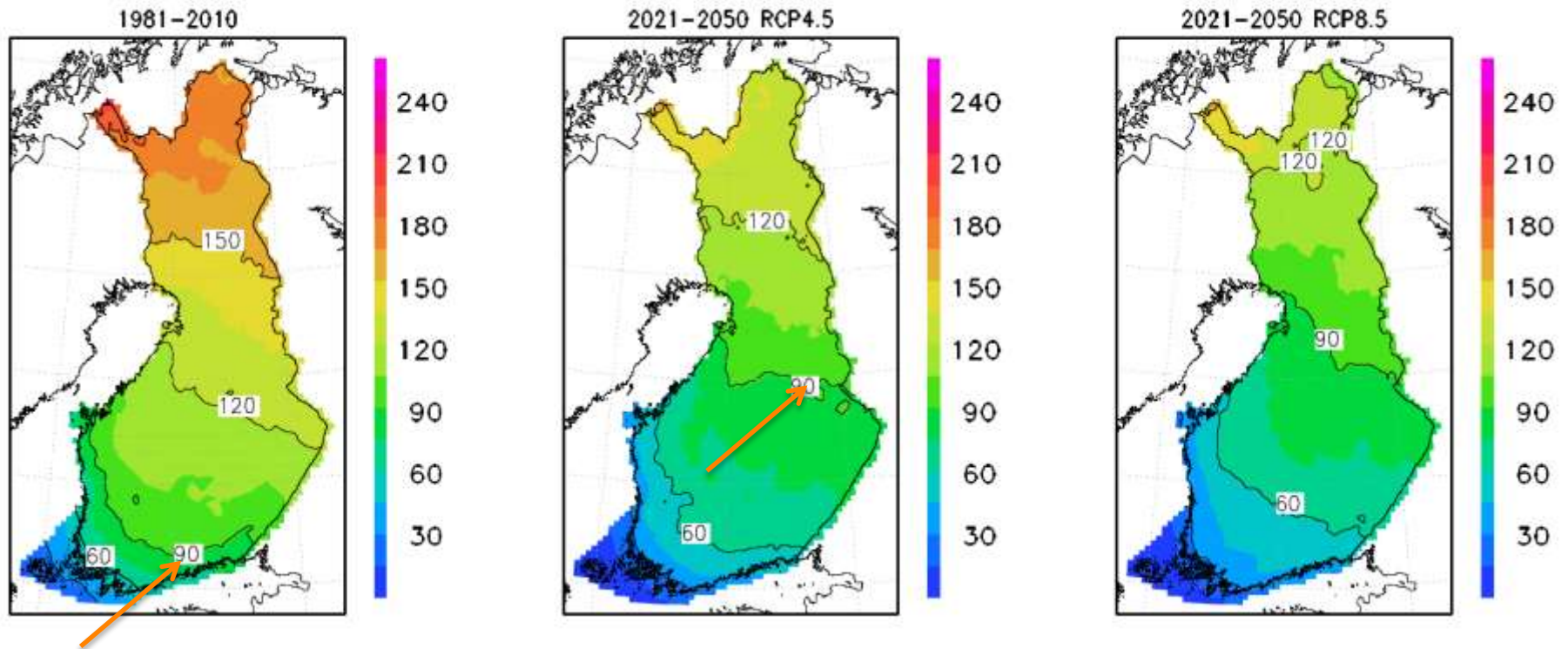


Figure concept from [Shrink That Footprint](#)

Source: [CDIAC](#); [NOAA-ESRL](#); [Houghton and Nassikas 2017](#); [Hansis et al 2015](#); [Joos et al 2013](#); [Khatiwala et al. 2013](#); [DeVries 2014](#); [Le Quéré et al 2017](#); [Global Carbon Budget 2016](#)

Changing climate depth of frost ≥ 20 cm or depth of snow ≥ 40 cm – Pine stand on peatland

Pine forest on peatland



NTFP's and forestry

Max shadow



Shadow plants

Semi-shadow plants

Semi-light plants

Light plants

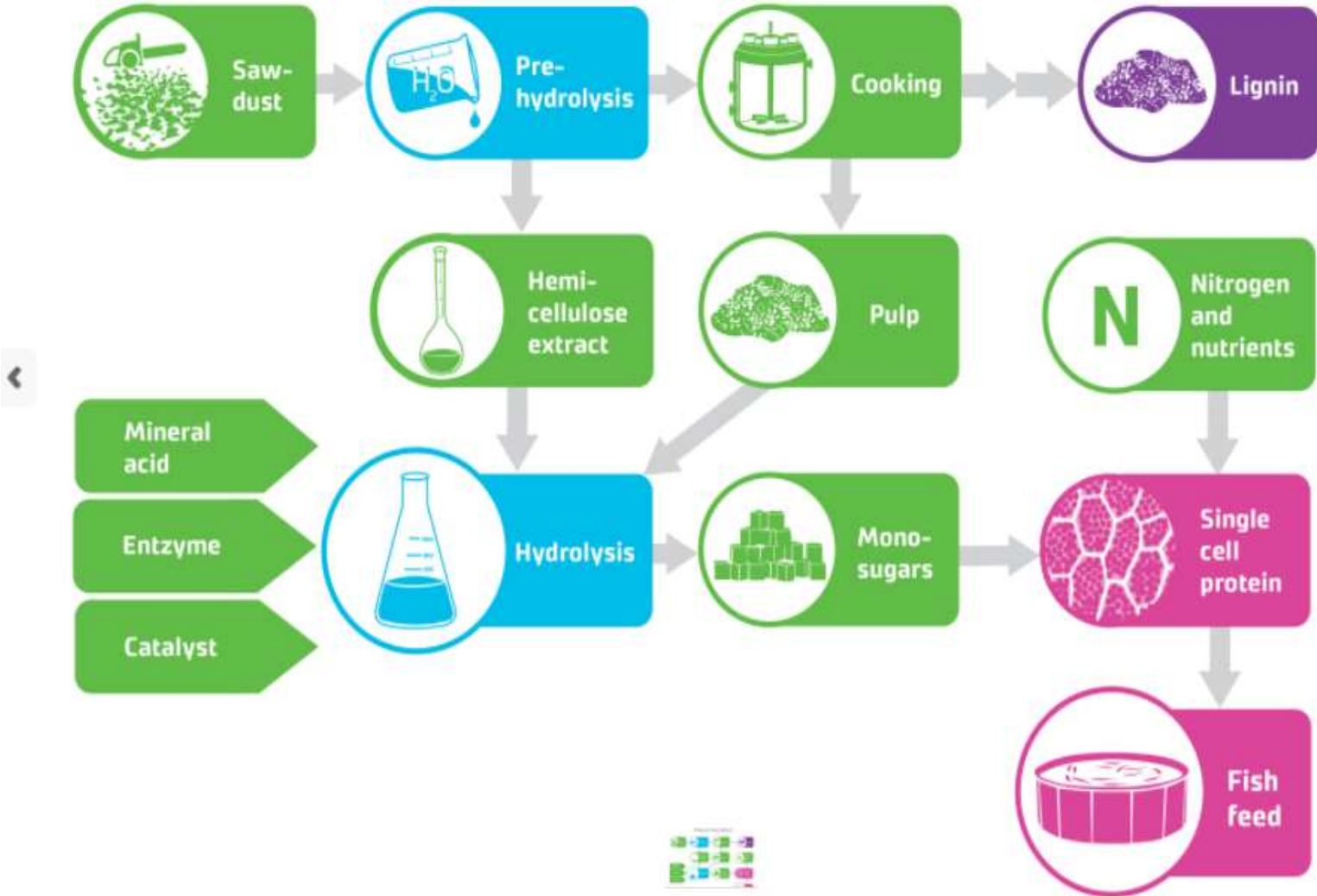
Max light

Species	Clear cutting	Thinning	Recovery
<i>Oxal acet</i>	- - -	+ +	Medium slow
<i>Hylo sple</i>	- - -	+ + +	Slow
<i>Vacc myrt</i>	- - -	+ +	Slow
<i>Dicr poly</i>	- -	- / +	Fast
<i>Pleu schr</i>	- -	+ + +	Fast
<i>Vacc viti</i>	-	+ + +	Fast
<i>Trie euro</i>	+ + +	+	Fast
<i>Empe nigr</i>	+	-	Fast
<i>Call vulg</i>	+ + +	- - -	Fast
<i>Desc flex</i>	+ +	- - -	Fast
<i>Cladina spp.</i>	+/-	- - -	Slow

Controlled NTFP production



NTFPs, processing and engineering



NTFPs and governance



Access and ownership rights are the result of historical institutional developments and reflect, among other things, existing land use patterns and the availability of forest and other land resources

NTFPs and governance – increasing population pressure challenges every man's rights



NTFPs and engineering

— 412 —
Pieniä keksintöjä
maatalouden alalta.



68. Omateloinen marjanpoimimislaitos.

Ylläoleva kuva esittää marjanpoimimislaitteen, josta olen itse tehnyt ja valmistanut. Se on sovitettu näitä varten verrattain eteväksi. Niitä olen sillä noukkinut kottalaisesta marjapöytästä 8 litraa marjoja tunnissa. Laitetta on toivottu pidettävä näiden tyylin. Parita pitää kuljuttaa marjat astiaan.
Eskus Jusila.

län muutenkin hyvin hitaasti löysi. Senraavassa esittän keksintöni, jolla olen itse riittävästi kokeillut ja sovitettuasi ja tehessä jeta-
hinoin.

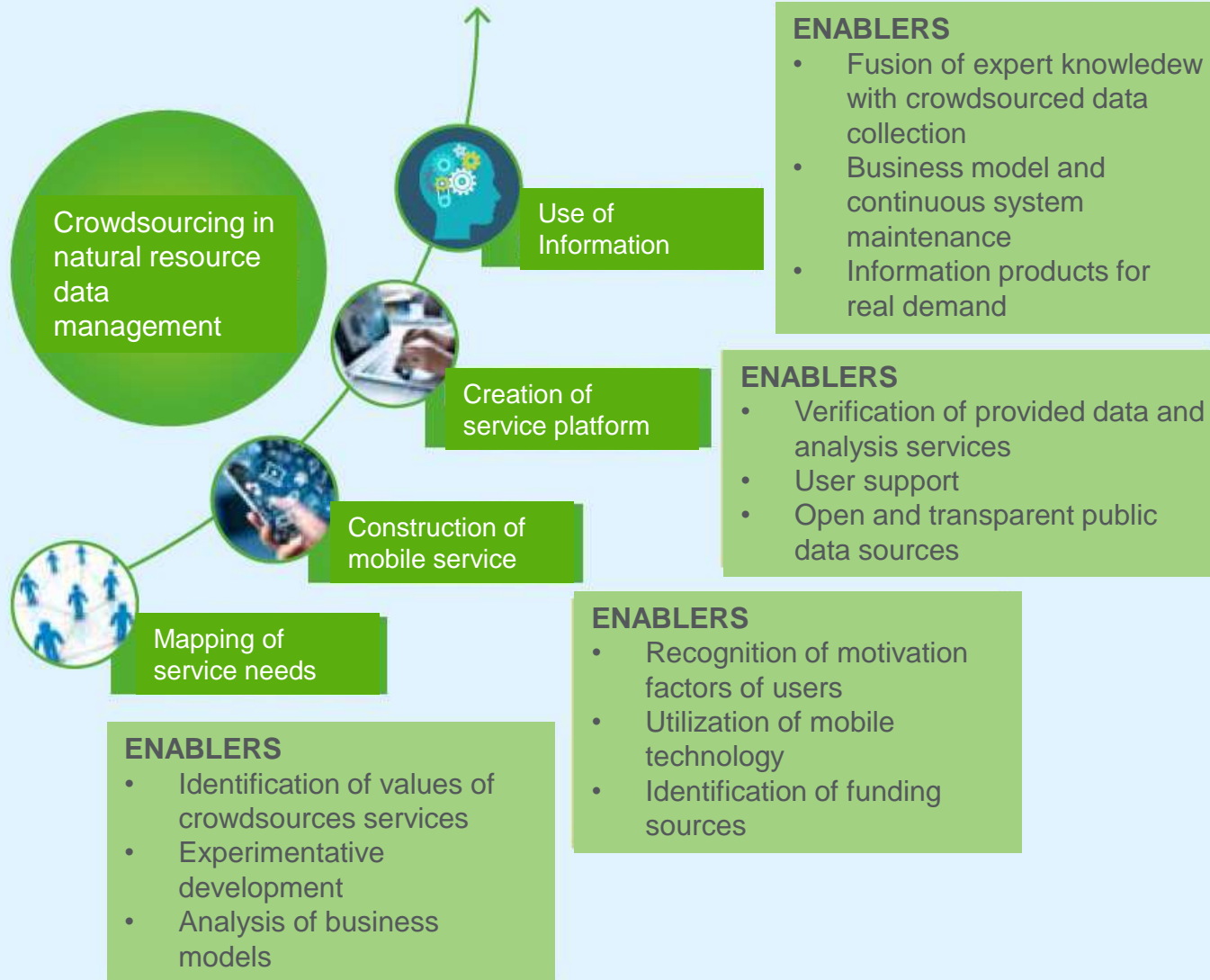
Laitteen ensi 12 cm leveyden vahvuudesta laus-
pinta ja 75 cm leveyden ja
kehänsä toiseen päähän tu-
tti vain pieni liista oikeasti
se jää avonaiseksi lamalla ta-



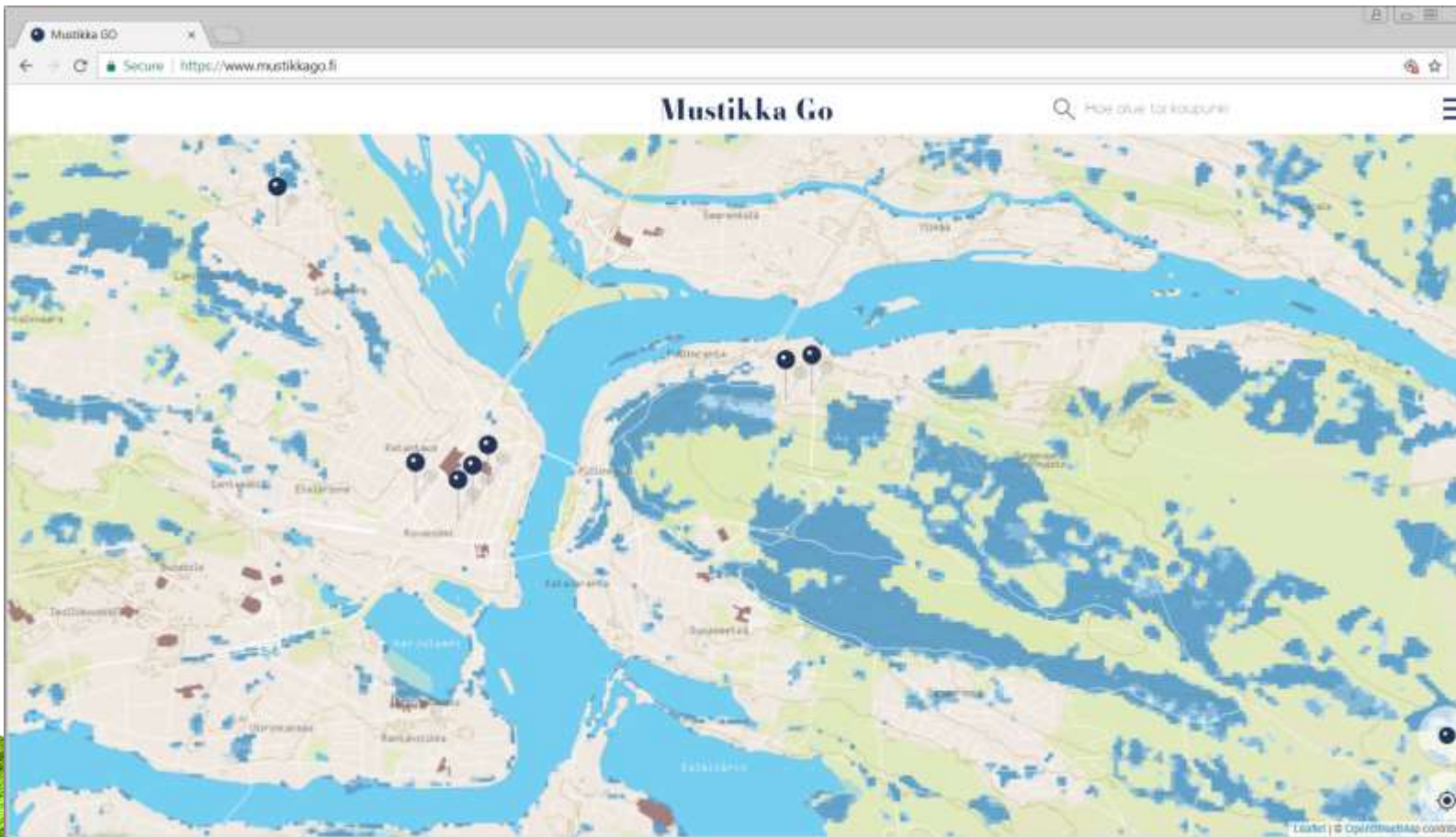
Crowdsourcing – observations and data collection about biosources

- Field data collection is expensive
- Difficult-to-find issues especially demanding
 - Insect outbreaks damaging trees
 - Berry and mushroom sweet spots
 - Game, rare animals
- Motivation is a challenge
 - Why would I report my observations?
 - Do I loose or win by doing so
- Data is not always statistically sound
 - No stratified sampling but observations come along summer cottage paths
 - Timing of field visits often random
- Interpretation of data needs expertise
 - Identification of insects, mushrooms etc.

Crowdsourcing development pathway



Potential berry picking sites – linking NFI data with crowdsourcing



NTFPs, production and markets

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1.4 €/kg

Bilberry
(cleaned)
4 €/kg

Dried bilberry
powder
100 €/kg

Bilberry tincture
3500 €/kg

NTFPs and health and well being



NTFP's and bioeconomy, Arctic centre – full setting

- NTFP's and forestry
- Governance and NTFP's
- Controlled NTFP production
- NTFP production and markets
- Novel perspectives of NTFPs
- NTFP products, processing and engineering
- Molecular biology and chemistry of NTFPs
- Health and well-being related applications



Lumene natural cosmetics – takeaway message for men and women

