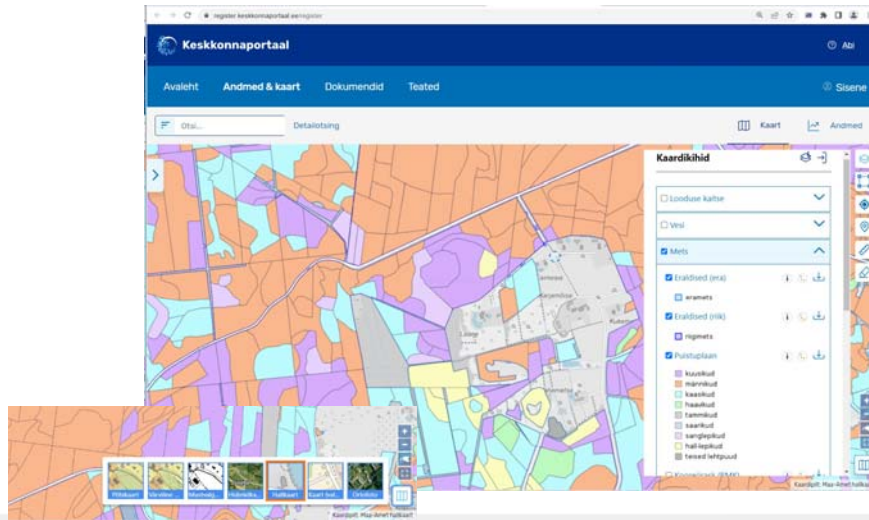




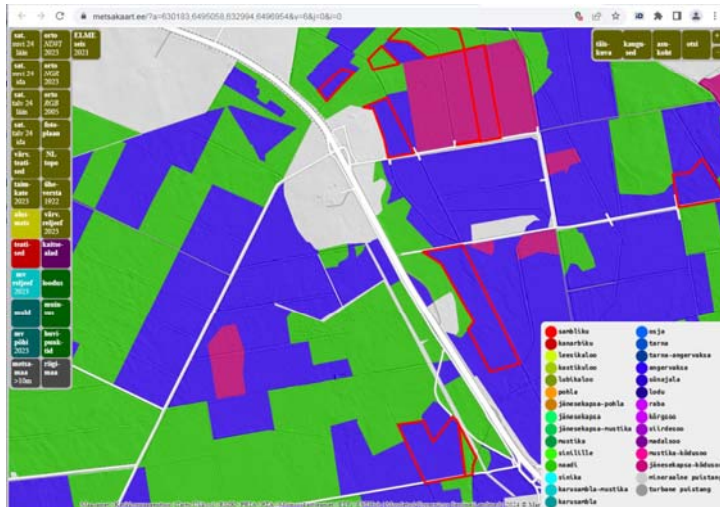
Infoallikad

Keskonnaportaal <https://register.keskonnaportaal.ee/register>



Infoallikad

“metsakaart.ee”

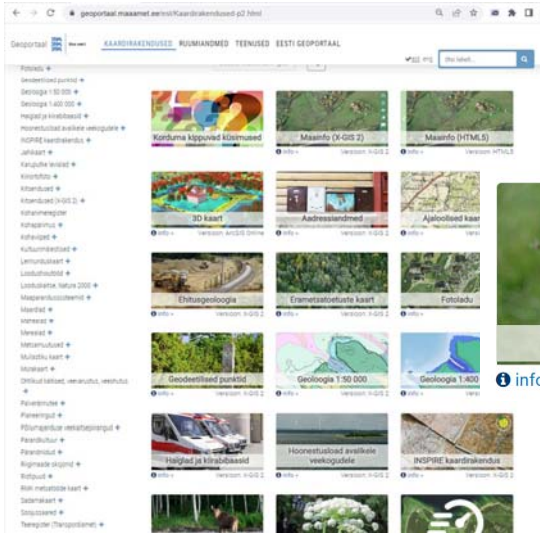




Infoallikad

Maa-ameti rakendused

<http://xgis.maaamet.ee>



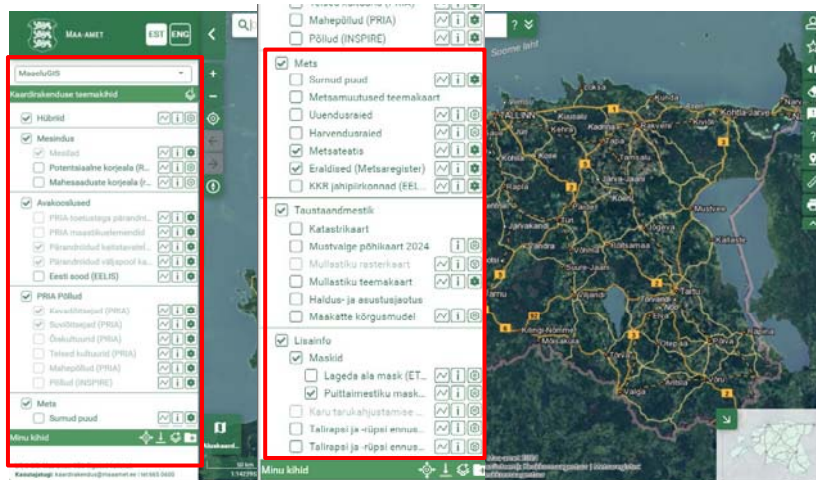
MaaeluGIS

Version: X-GIS 2



MaaeluGIS

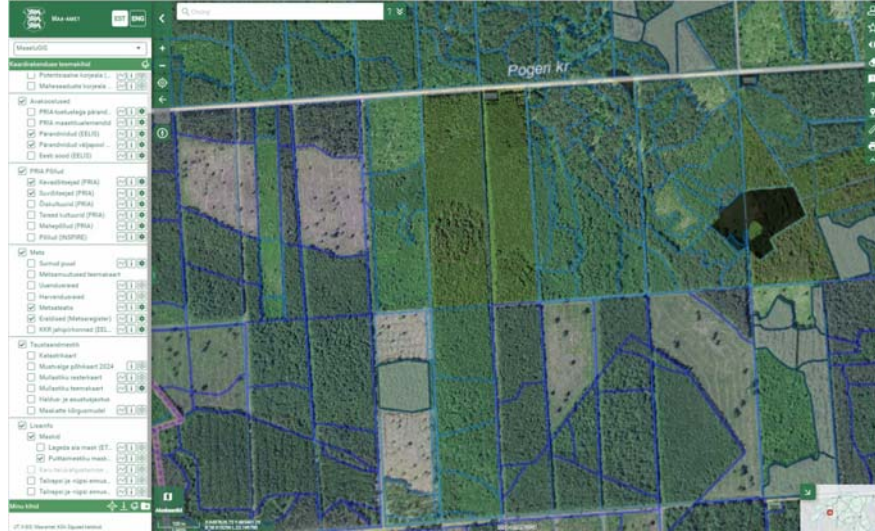
Kombineeritud avalik info



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



MaaeluGIS

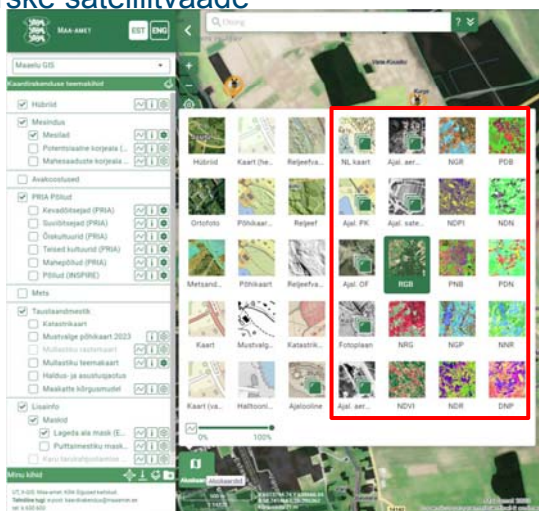


<https://xgis.maaamet.ee/xgis2/page/app/maaeluGIS>



XGIS: MaaeluGIS

Ajalugu ja värsked satelliitvaade

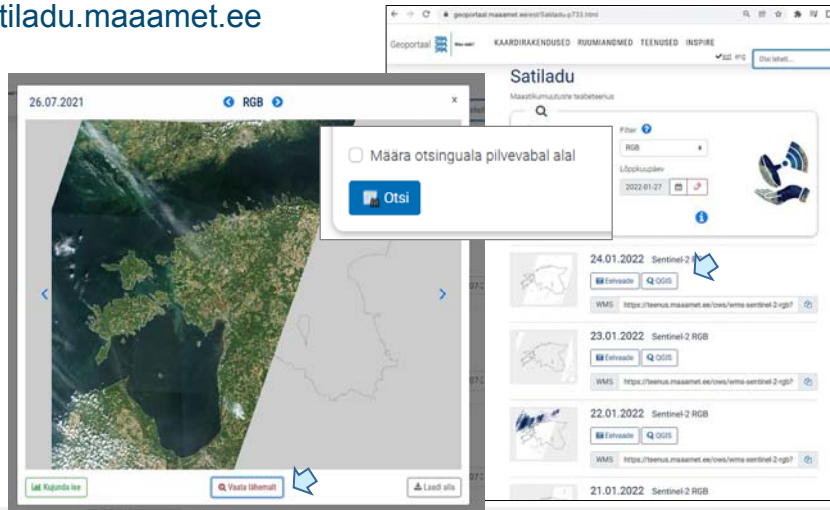


<https://xgis.maaamet.ee/xgis2/page/app/maaeluGIS>



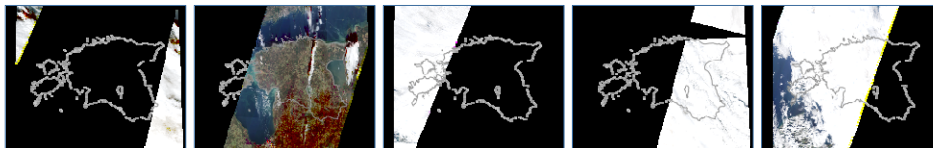
Maa-ameti ESTHub / Satiladu

Lihtkasutaja rakendus: Satiladu (EstHub, Copernicus)
satiladu.maaamet.ee



Piltide saadavus

Sarnane kaader iga viie päeva tagant



30 okt

31 okt

1 nov

2 nov

3 nov

(Satiladu, Sentinel-2)

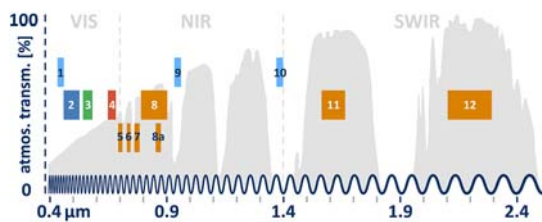
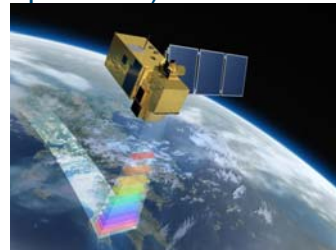


Alginfo

- Sentinel-2 satelliitpildid (EstHub, Copernicus)
- 10m piksel

Kanalid:

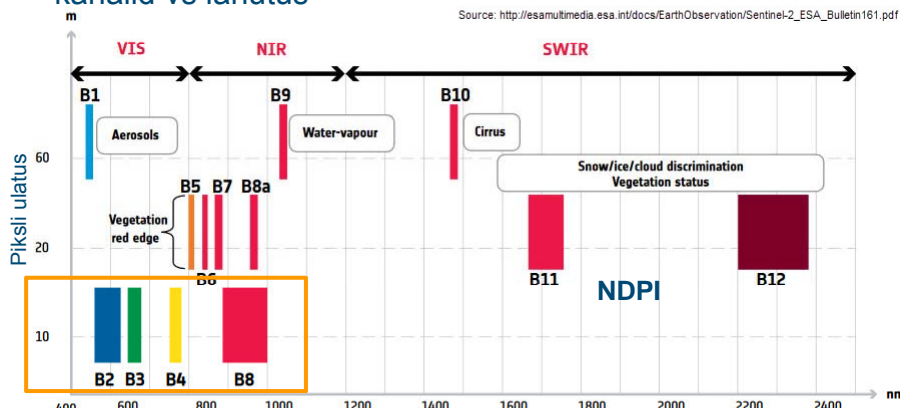
- Roheline
- Sinine
- Punane
- Lähis-infrapunane



Kaugseire

Sentinel-2 satelliitpildid (EstHub, Copernicus)
– kanalid vs lahutus

Source: http://esamultimedia.esa.int/docs/EarthObservation/Sentinel-2_ESA_Bulletin161.pdf

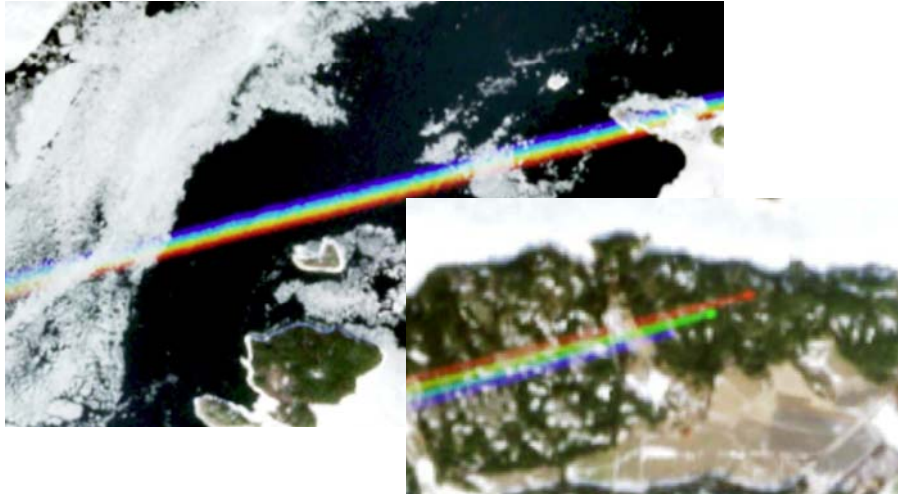


Kanalid: sinine, roheline, punane, lähi-infrapunane
+ lühilaineline infrapunane



Kaugseire

Sentinel-2 – kanalid

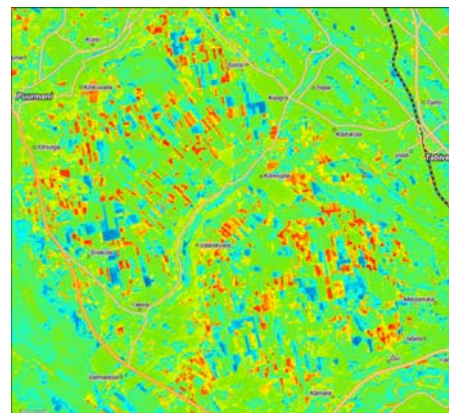


Soome (Maa-amet Satiladu)



Metsad - Satelliitanalüüsid

Metsamaa ja raiete kaardistamine talvistelt piltidelt

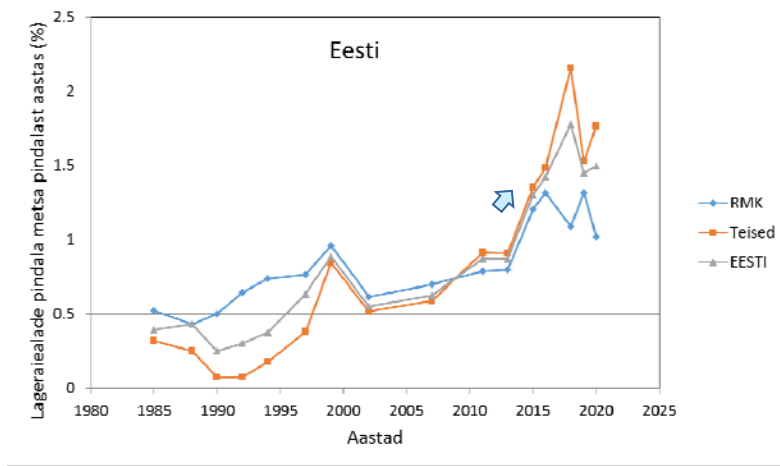


Landsat TM piltidelt (Peterson jt 2004)



Raiesurve Eestis - kaugseire

U. Petersoni hinnang raietele satelliitpiltide põhjal



(Peterson & Liira 2023)



Kaugseire tulestised

Sentinel-2 satelliitpildid (EstHub, Copernicus)

- NDVI - Normalized Difference Vegetation Index
- NDPI - Normalized Difference Pond Index
- Erinevad teised valemvärvi tulestised



$$NDVI = \frac{NIR - Punane}{NIR + Punane}$$

$$NDPI = \frac{SWIR - Roheline}{SWIR + Roheline}$$

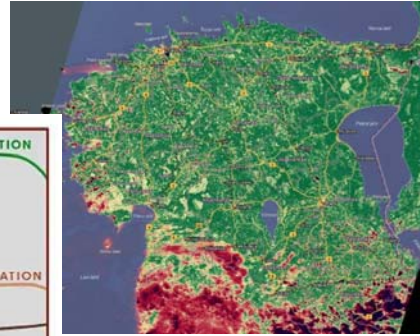
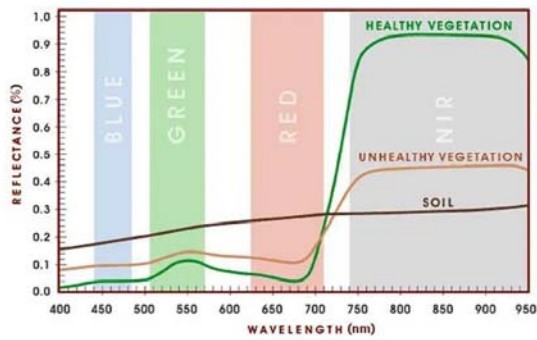
- RGB** - hariik värvifoto
- NRG** - valemvärvipilt "Lähi-infrapuna Punane Roheline"
- NDVI** - **taimkatte** indeks "Normalized Difference Vegetation Index"
- NGR** - valemvärvipilt "Lähi-infrapuna Roheline Punane"
- NDPI** - **veekogude** indeks "Normalized Difference Pond Index"
- PNB** - valemvärvipilt "NDPI Lähi-infrapuna Sinine"
- NGP** - valemvärvipilt "Lähi-infrapuna Roheline NDPI"
- NDR** - valemvärvipilt "Lähi-infrapuna NDVI Punane"
- PDB** - valemvärvipilt "NDPI NDVI Sinine"



Tuletised

Sentinel-2 satelliitpildid (EstHub, Copernicus)
NDVI - Normalized Difference Vegetation Index

$$NDVI = \frac{NIR - Red}{NIR + Red}$$



Satiladu

Valmisindeksid ja abikihid

Kataster

Riigimets

Eramets

Kaitsealad

Kaitsemets

Teatised

Põld

Kõrgused

Põhikaart

Mullastik

suurenda sisse

suurenda välja

põhjasuund / Shift + Alt + nire vasak klahv

navigeeri eelmisele

navigeeri järgmisele

suurendusaste / 1

näita oma asukohta

salvesta k

salvesta k

salvesta k

koordinaadid

NDVI väärtsus

621336 656326 ... 0.8187

võrreldav pilt

võrreldav pilt

võrreldav pilt

2023-06-13 NGR

2023-06-06 NGR

RGB

NRG

NDVI

NGR

NDPI

PNB

NGP

NDR

PDB

NDN

PDN

NNR

DNP

Kujundatud

suurenda sisse

suurenda välja

põhjasuund / Shift + Alt + nire vasak klahv

navigeeri eelmisele

navigeeri järgmisele

suurendusaste / 1

näita oma asukohta

salvesta k

salvesta k

salvesta k

koordinaadid

NDVI väärtsus

621336 656326 ... 0.8187

võrreldav pilt

võrreldav pilt

võrreldav pilt

2023-06-13 NGR

2023-06-06 NGR



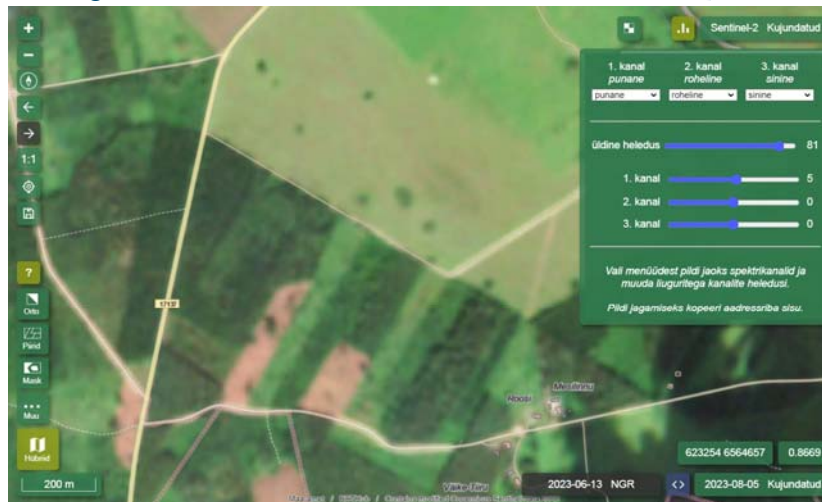
Satiladu

satiladu.maaamet.ee



Satiladu

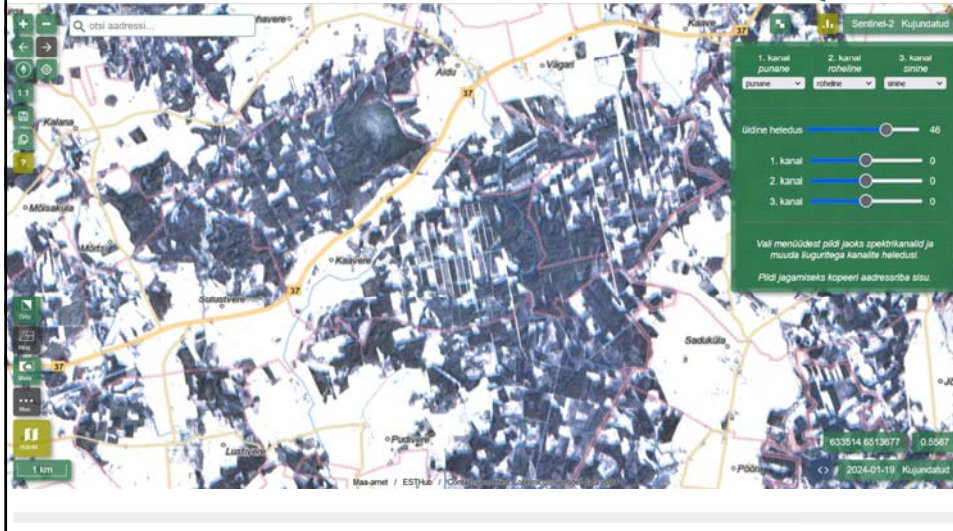
Isetegemine





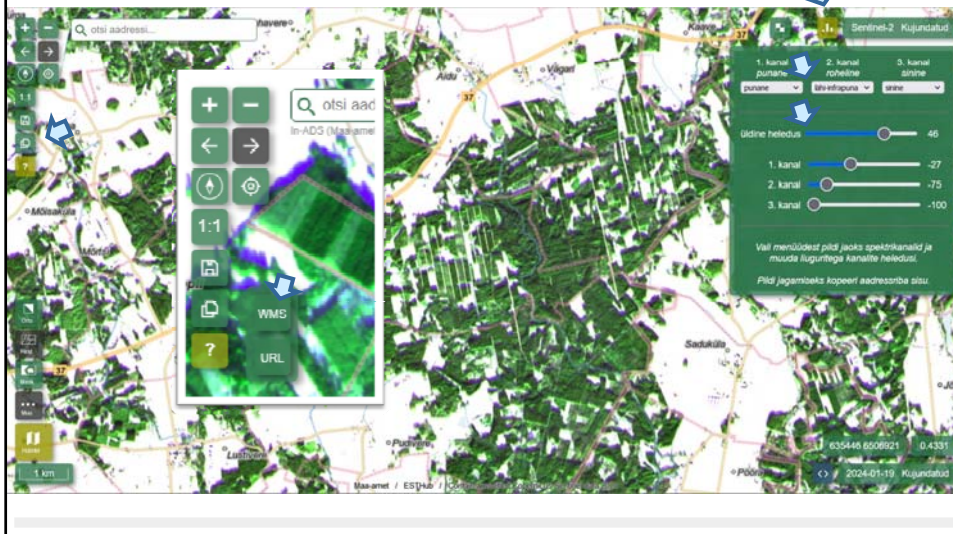
Satiladu

Isetegemine



Satiladu

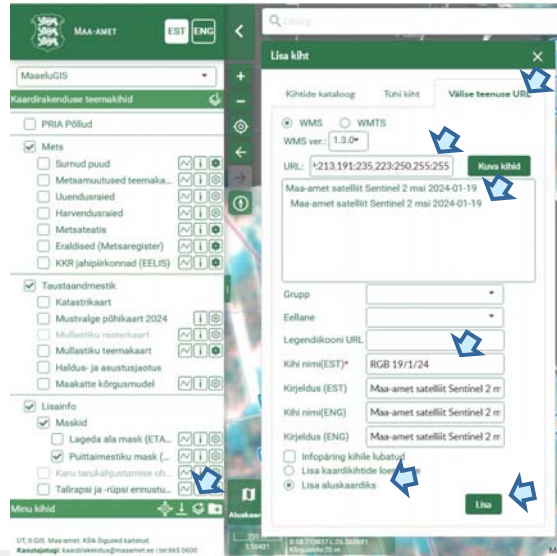
Isetegemine





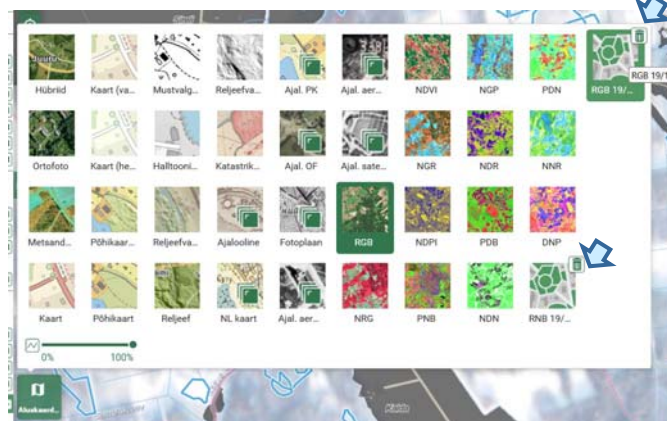
XGIS – kaardikihi lisamine

Minu kihid



XGIS - satipilt

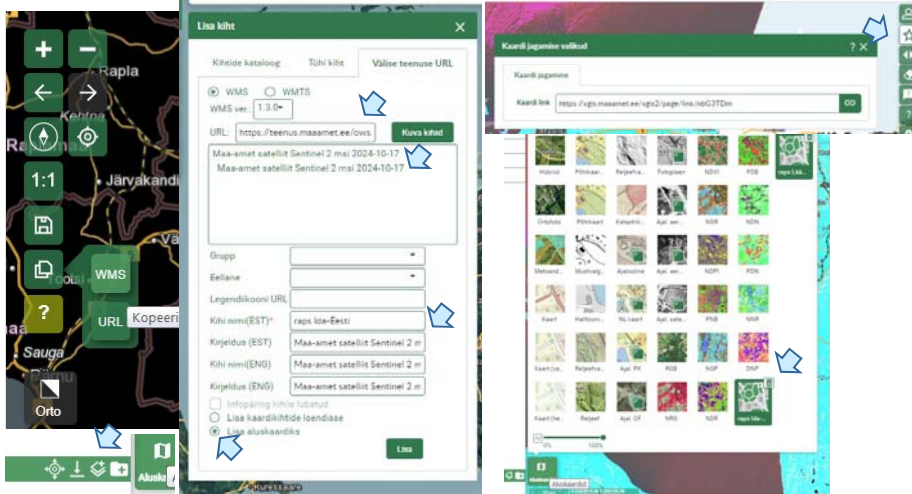
Aluskaardi lisamine





MaaeluGIS ja Satiladu

Lisa oma satipilt XGIS aluskaardiks

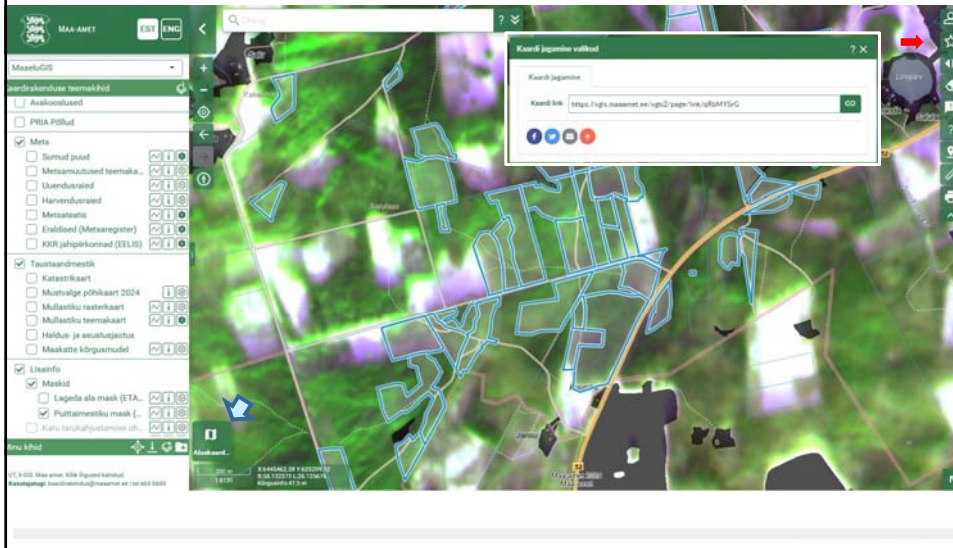


<https://xgis.maaamet.ee/xgis2/page/link/2OwjXzSp>



XGIS - satipilt

“Salvestamine”





XGIS - satipilt

Optimeerimine



XGIS - satipilt

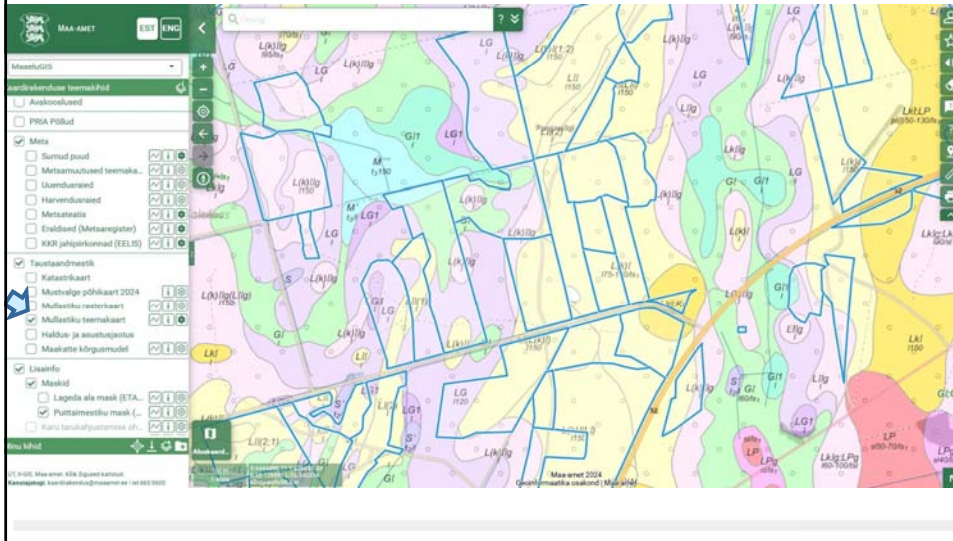
Kuva optimeerimine





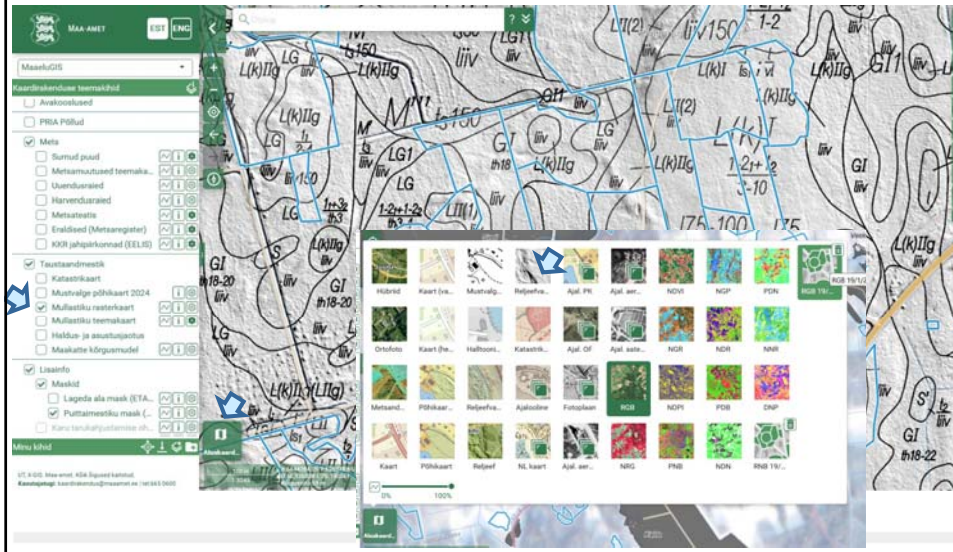
XGIS - MaaeluGIS

Mullakaart + valitud metsaeraldised (PH?)



XGIS - MaaeluGIS

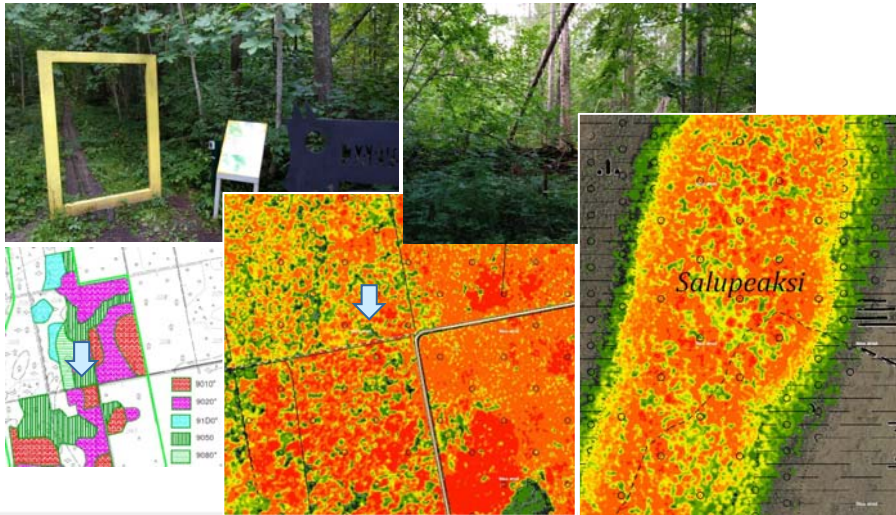
Kihte kombineerimine





Looduslik – häilud puistus

Loomulik kujunemine – Järvelja, Nigula peaksi jt



MaaeluGIS / Satiladu

„Looduse“ taastamine - puisniidud

Suvi 2023, PDB





Säilik-struktuurid ja põldisalad

MaaeluGIS



Maakate + Fotoplaan 1952

Peressaare

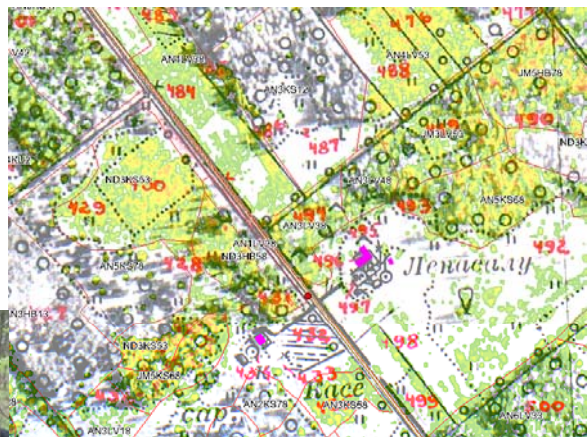


(Verstakaart; Maa-amet, XGIS)

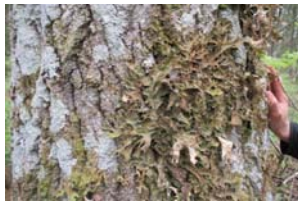


Säilik-struktuurid

Ajalugu



(Peressaare)



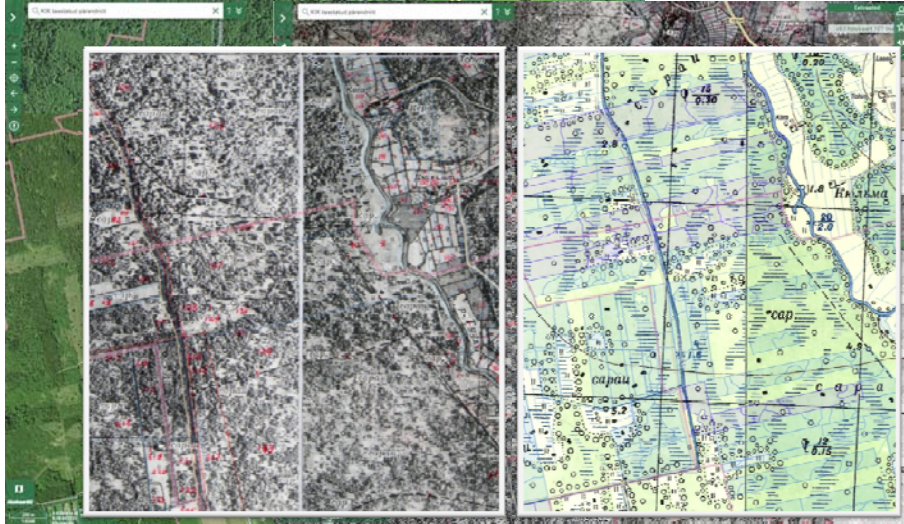
(Kopsusamblik - Avinurme)

(Maa-amet, XGIS)



MaaeluGIS

„Looduse“ taastamine - puisniidud



Ortofoto

1952



Kultuuri ja struktuuri ajalugu

Sagadi



(Metsaregister 2022)



Kultuuri ja struktuuri ajalugu

Sagadi



(Sagadi 1870 RMK keskuse seinakaart)



Kultuuri ja struktuuri ajalugu

Sagadi



(Vene 1-verstane ca 1900 + kataster)



Kultuuri ja struktuuri ajalugu

Sagadi



(Eesti vabariig topokaart 1930dad + kataster)

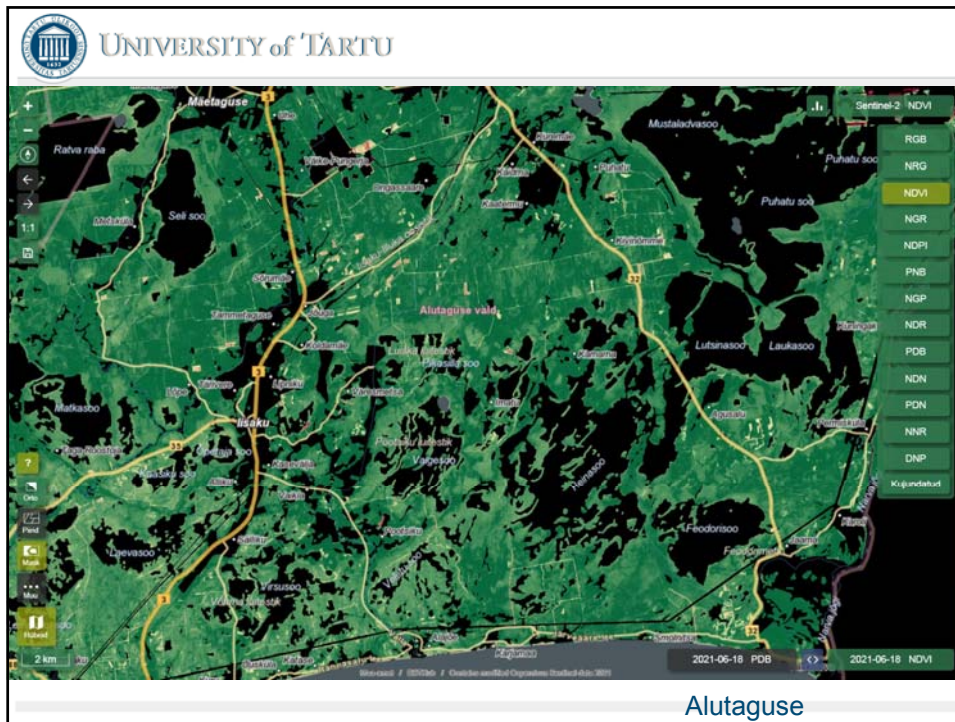


XGIS: MaaeluGIS

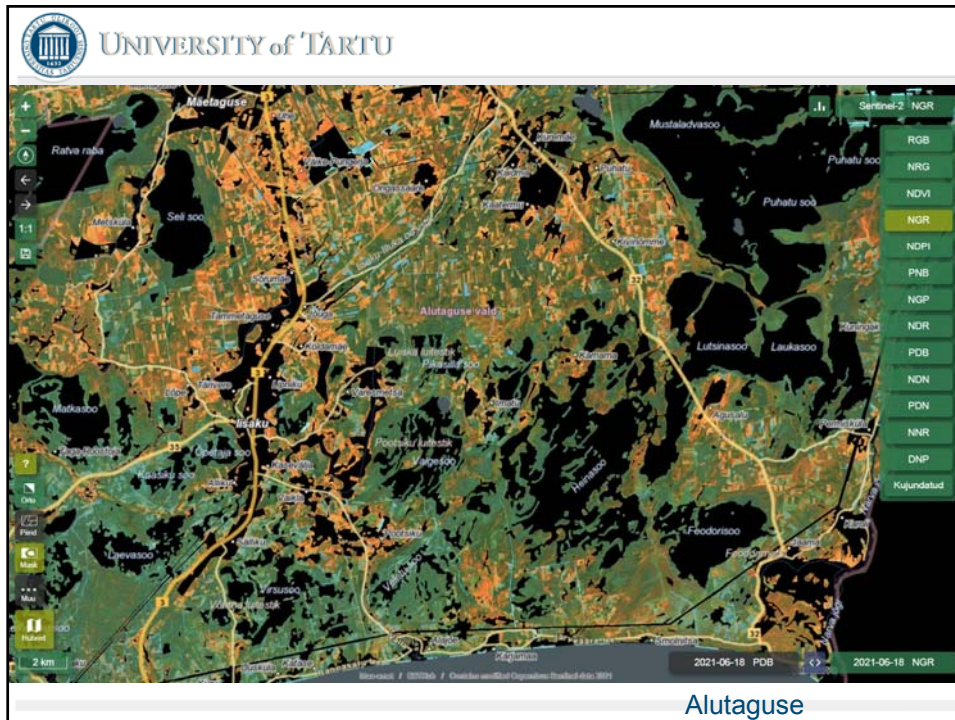
Metsamuutus LiDAR
Satelliit Sentinel-2 (PDB)



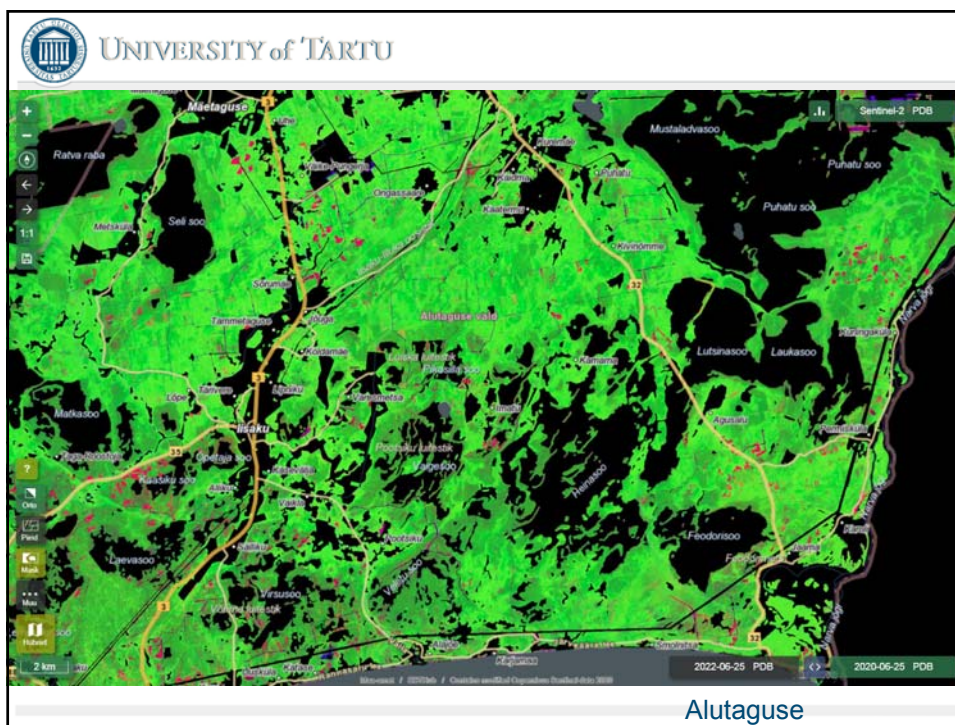
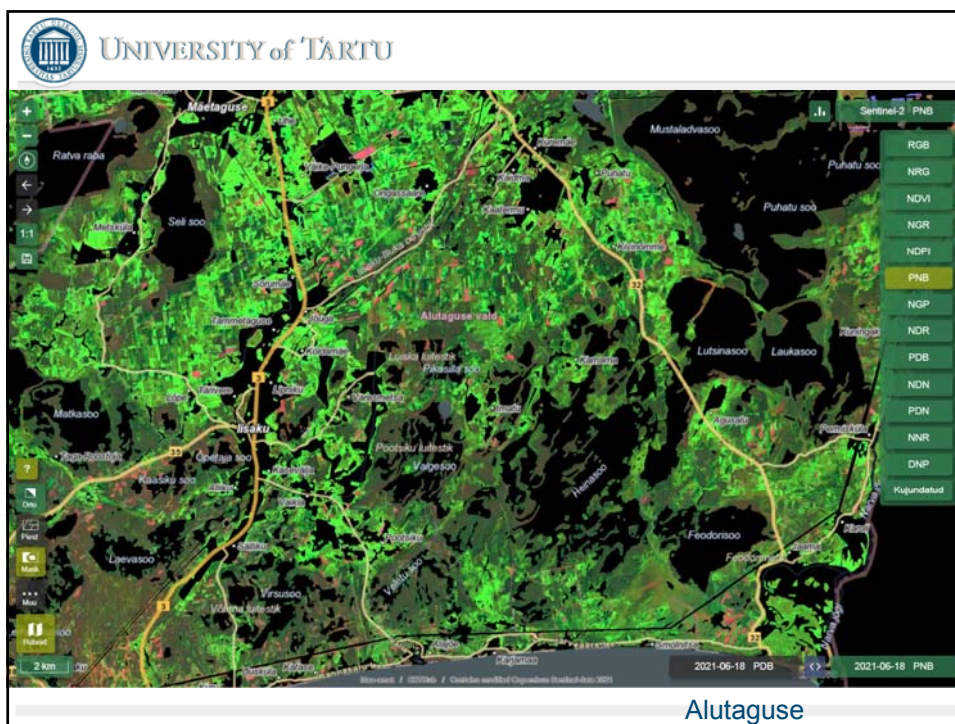
<https://xgis.maaamet.ee/xgis2/page/app/maaeluGIS>

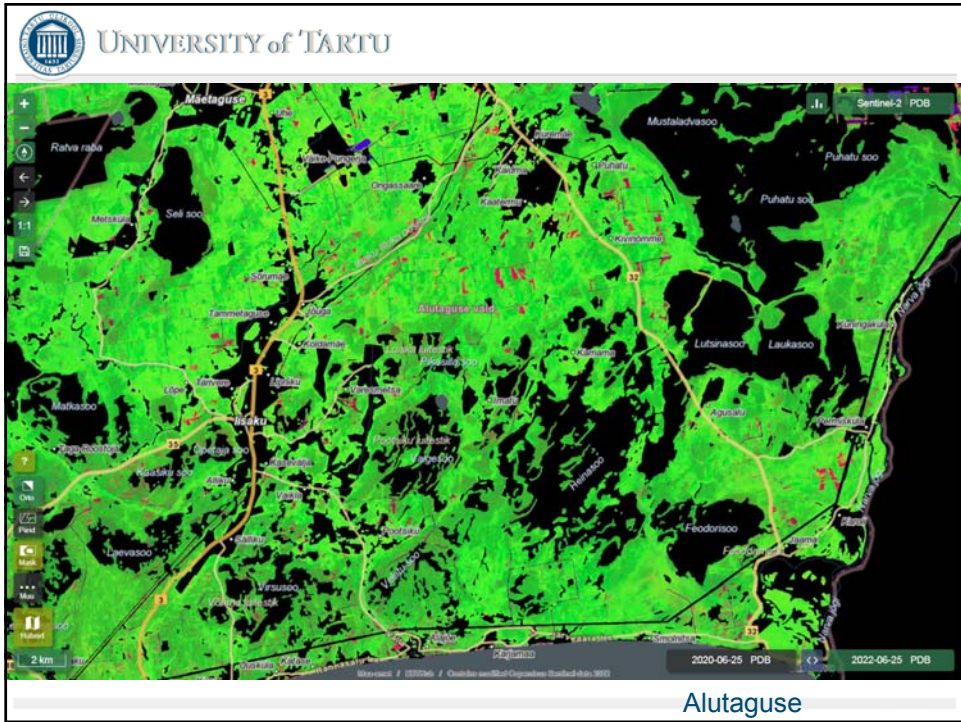
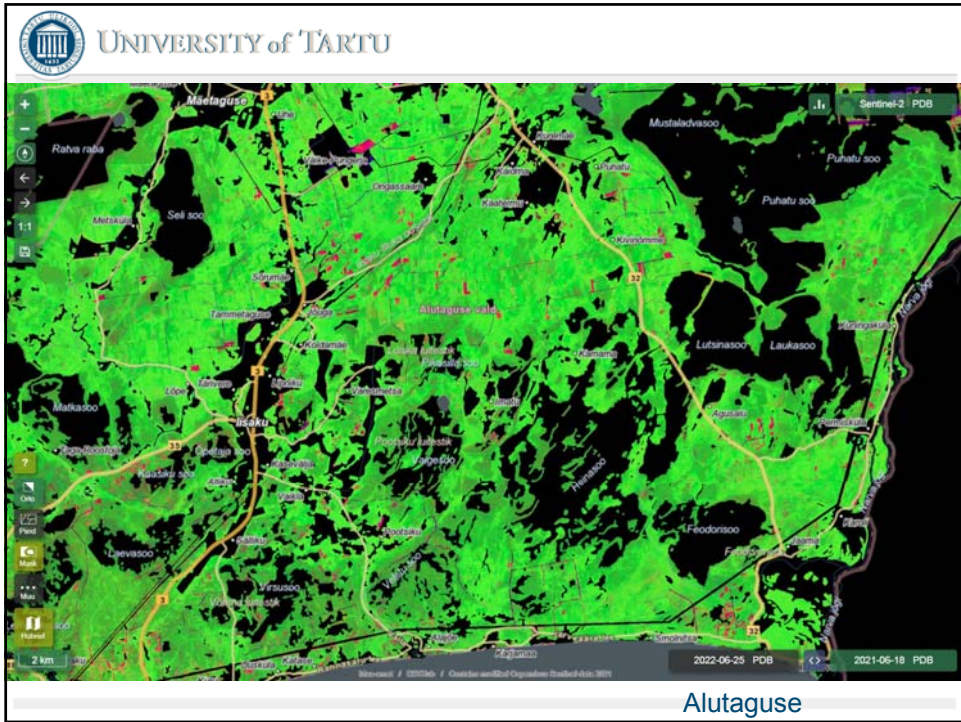


Alutaguse



Alutaguse







XGIS: MaaeluGIS

Sumud puud

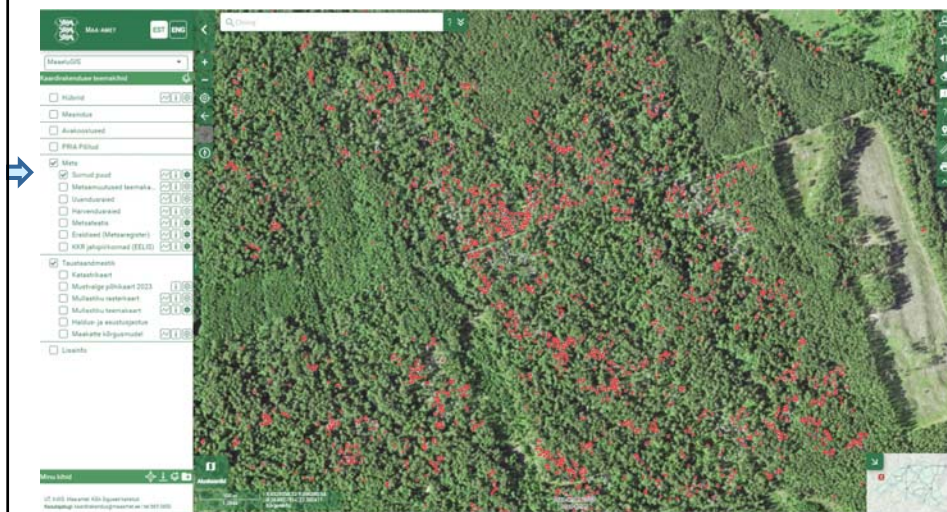


<https://xgis.maaamet.ee/xgis2/page/app/maaeluGIS>



XGIS - MaaeluGIS

Sumud puud + Ortofoto





XGIS: MaaeluGIS

Metsamuutus (Surnud puud)

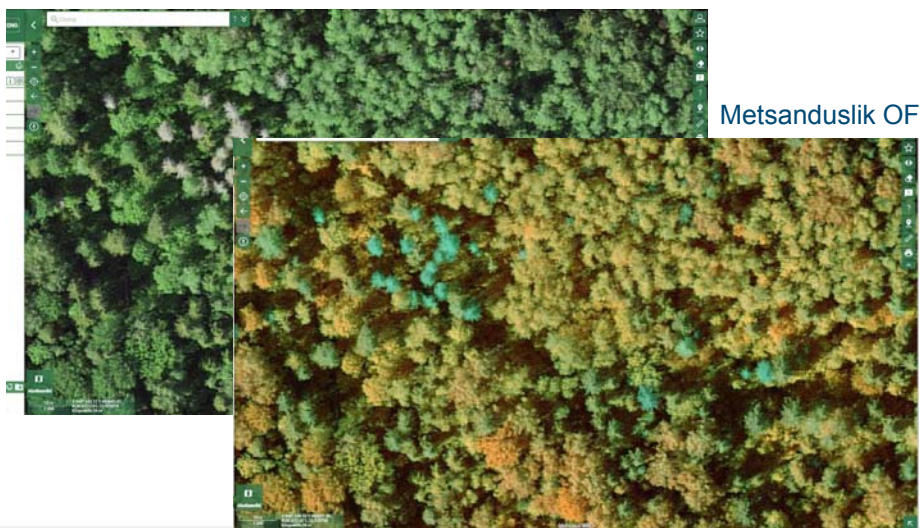


<https://xgis.maaamet.ee/xgis2/page/link/Ps5T6vL4>



XGIS - MaaeluGIS

Ortofoto





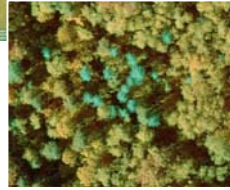
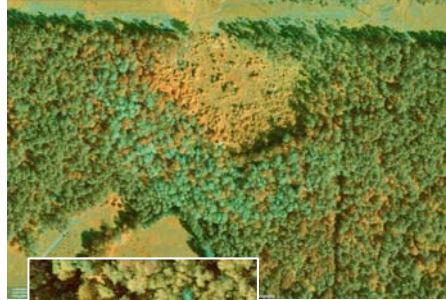
Puude suremise kaugseire

Ortofotod:

RGB



vs NGR (NIR, GREEN, RED)



XGIS - MaaeluGIS

Puude kaardistamise lähivaade



<https://xgis.maaamet.ee/xgis2/page/link/yv4m0l>



MaaeluGIS / Satiladu

Kontroll satelliidilt – august (NRG)



<https://xgis.maaamet.ee/xgis2/page/link/hwfKa6jh>



MaaeluGIS

Surnud puud + valevärv NGR → pikaajaline akumulatsioon





MaaeluGIS

Surnud puud + valevärv NGR → pikaajaline akumuleerumine



Surnud puud - Satiladu

Satiladu (EstHub, Copernicus) satiladu.maaamet.ee



<https://teenus.maaamet.ee/ows/wms-satiladu?sensor=sentinel-2&filter=ngr&date=2024-06-27&hybrid=1&mapbox=489638,6479679,492070,6481052>



Surnud puud - Satiladu

Satiladu (EstHub, Copernicus) satiladu.maaamet.ee



<https://teenus.maaamet.ee/ows/wms-satiladu?sensor=sentinel-2&filter=ngr&date=2024-06-27&hybrid=1&mapbox=489638,6479679,492070,6481052>



Surnud puud - Satiladu

Satiladu (EstHub, Copernicus) satiladu.maaamet.ee

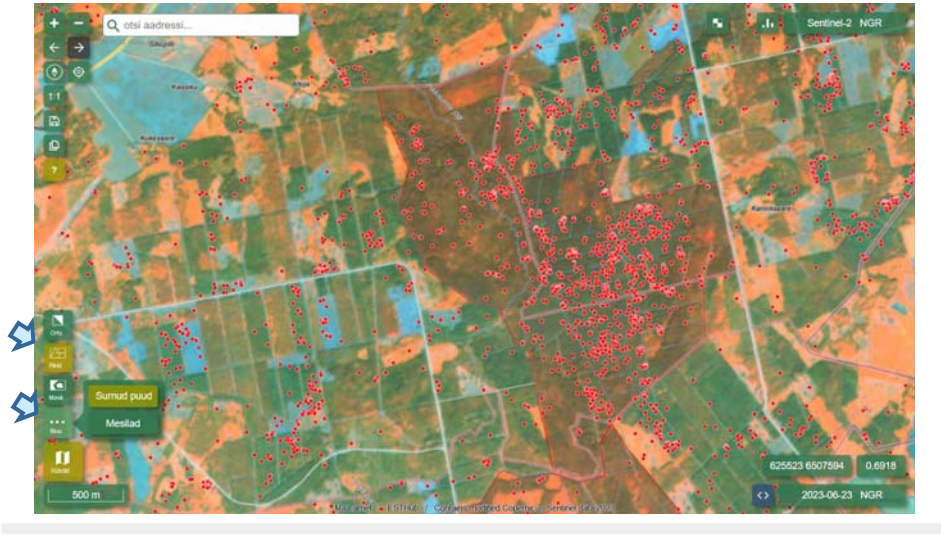


<https://teenus.maaamet.ee/ows/wms-satiladu?sensor=sentinel-2&filter=ngr&date=2024-06-27&hybrid=1&mapbox=489638,6479679,492070,6481052>



Satiladu

Surnud puud + metsanduslik satelliit (valevärv NGR)



MaaeluGIS

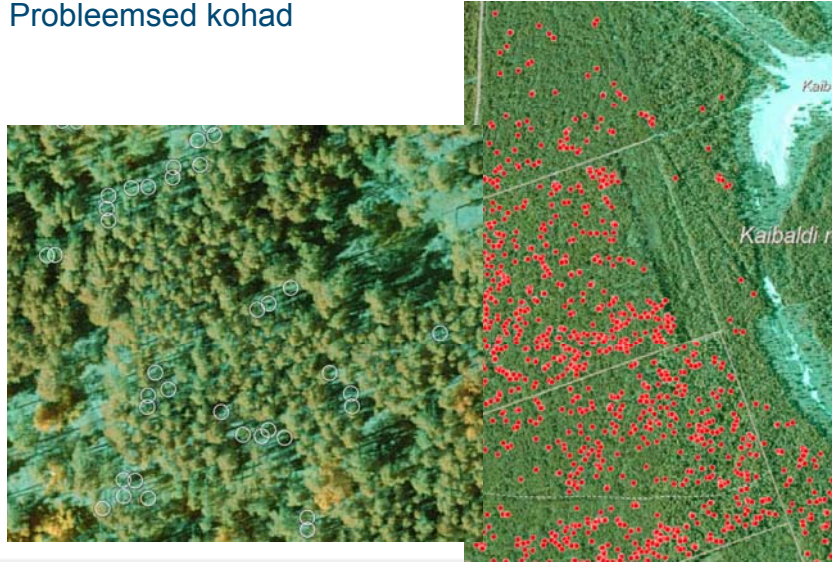
Probleemsed kohad





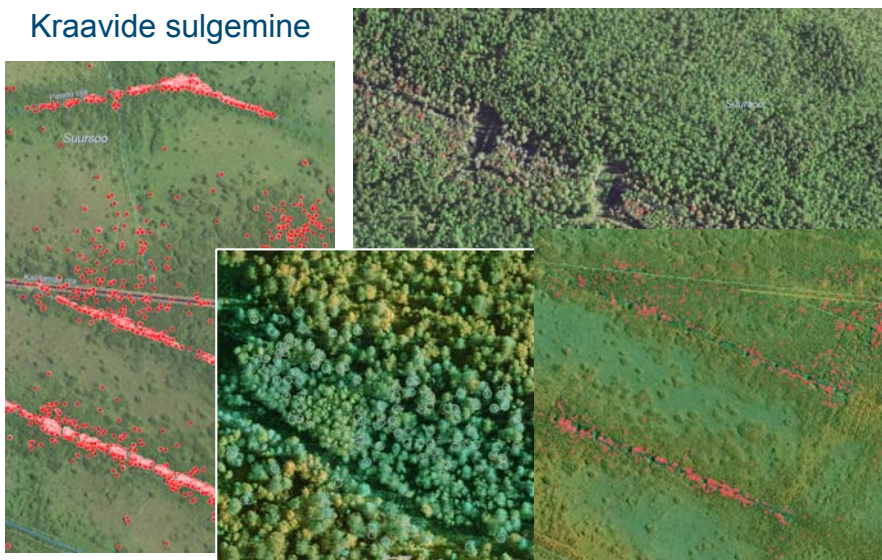
MaaeluGIS

Probleemsed kohad



MaaeluGIS / Satiladu

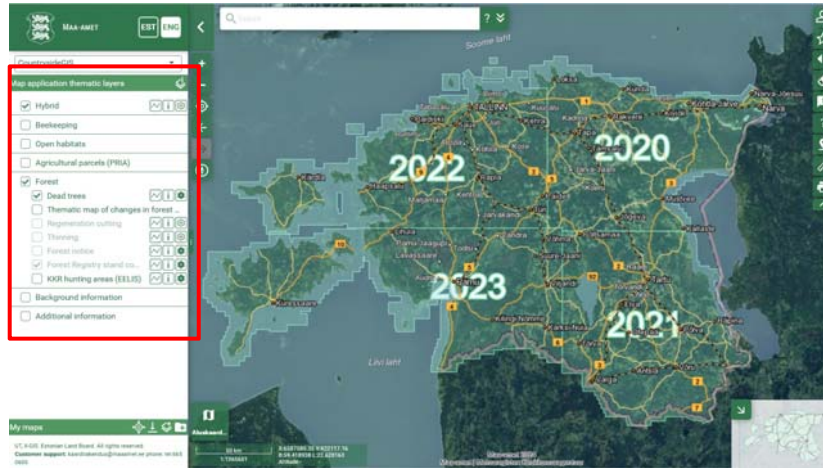
Kraavide sulgemine





Surnud puud

Info uuendamine

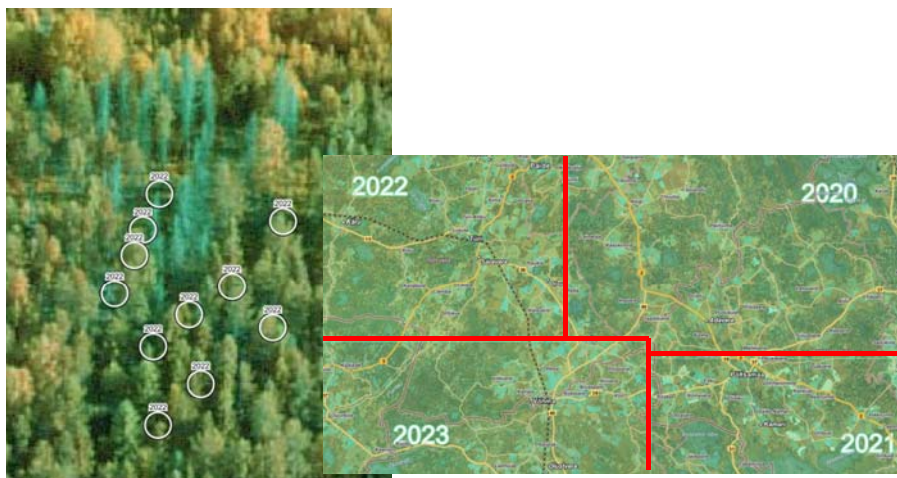


<https://xgis.maaamet.ee/xgis2/page/app/maaeluGIS>



Surnud puud - servamõjud

Puude eristamine 2022, taustafoto 2023



<https://xgis.maaamet.ee/xgis2/page/link/C9LO-d39>



XGIS: MaaeluGIS

Metsa häired (Munamägi) – Metsanduslik valevärv

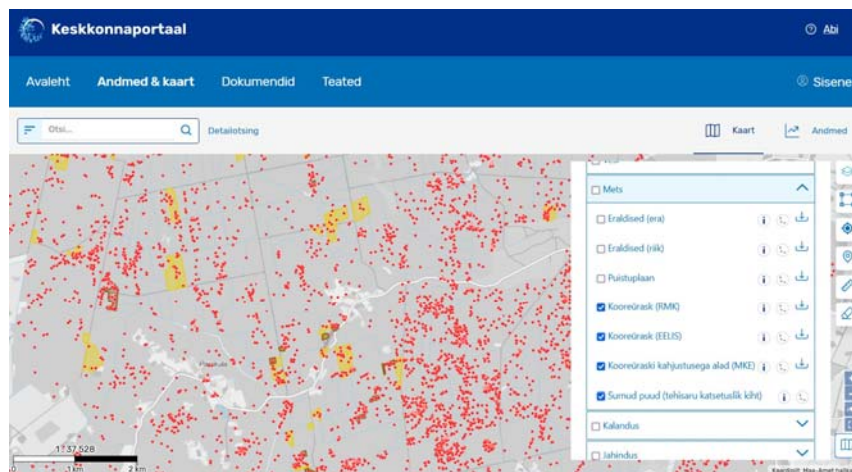


<https://xgis.maaamet.ee/xgis2/page/app/maaeluGIS>



Surnud puud

Keskonnaportaal

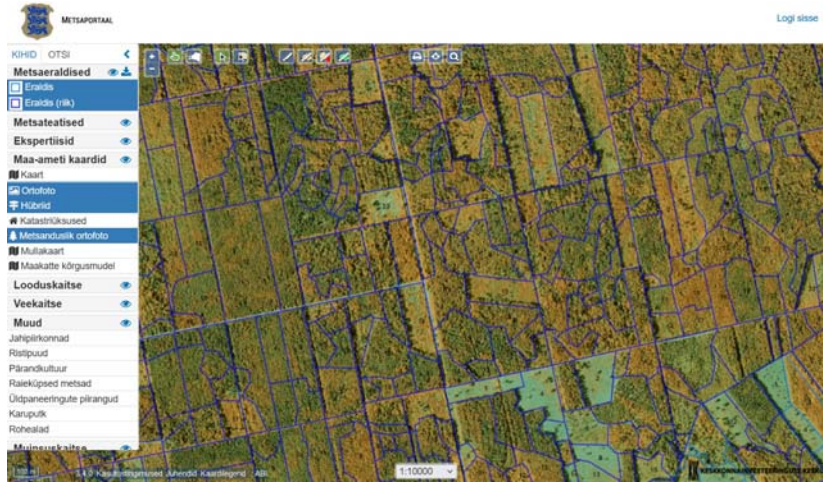


<https://register.keskkonnaportaal.ee/register>



Aga ...

Metsaregistri portaal



<https://register.metsad.ee/>



Õppeala

Droon



Teet Kivisilla
(Luua)



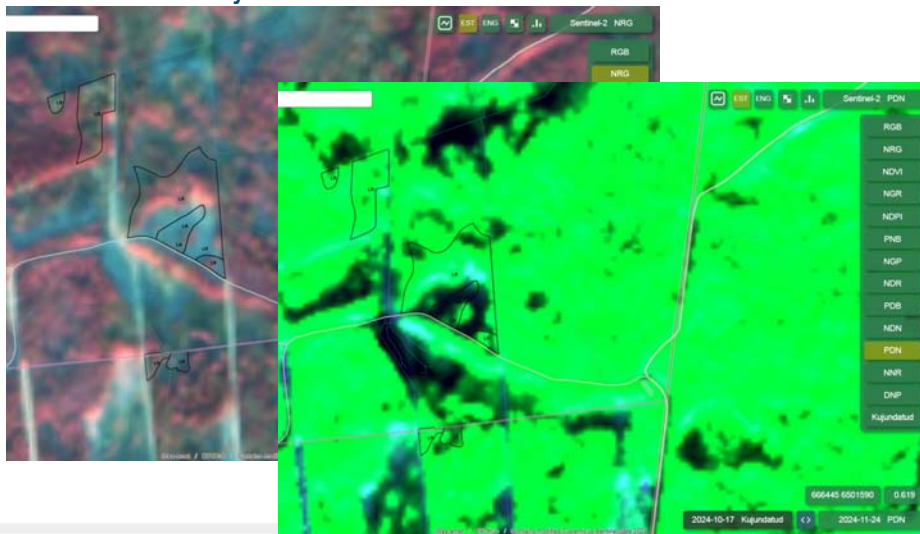
Õppeala

Struktuuride jätmine - Satiladu



Õppeala

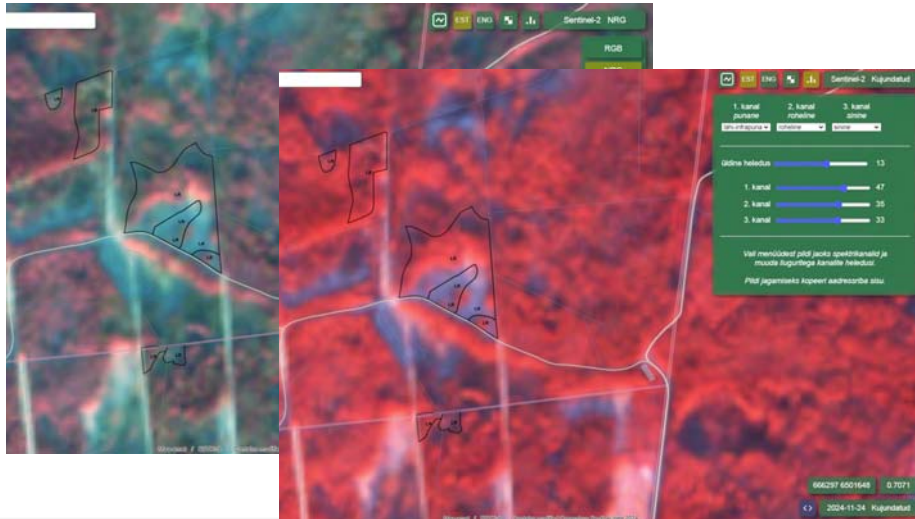
Struktuuride jätmine - Satiladu





Õppeala

Struktuuride jätmine - Satiladu



Õppeala

Droon



Teet Kivisilla
(Luua)



UNIVERSITY of TARTU

Tänu!



Maa-amet:

Tanel Hurt
Erkko Grünthal
Martin Menert
Triin Tajur
Kristjan Liiv

Leivaisad: Horisont2020 EFFECT
ETAG PRG1223

Kontakt:
Jaan Liira (jaan.liira@ut.ee / 5240798), Tartu Ülikool