Agroforestry and shelter belts for climate change mitigation

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Trees role outside the forests

"*Research and innovation on agroforestry systems and other trees outside the forests will be reinforced….*"

/New EU forest strategy for 2030/

"*The framework definition for 'arable land' should be laid down in a way that allows Member States to cover different production forms, including system such as agroforestry and arable areas with shrubs and trees...*"

/CAP 2023-27 strategic plan regulation/

Biomass production potential of shelter belts around drainage systems

- The **aim of the study** is to elaborate scientific substantiation for transformation of buffer zones around drainage ditches into “biomass factories”.
- Structure of the project:
  - evaluation of growth potential of fast growing tree species suitable for transformation of the buffer zones into “biomass factories”;
  - selection of technologies and elaboration of innovative work methods for mechanized planting, early tending and harvesting of “biomass factories”;
  - elaboration of decision support tools and guidelines for transformation of the buffer zones into the “biomass factories”.
- Topic of this presentation – **spatial analysis of areas suitable for establishment of the “biomass factories” *(15 m wide buffer zones on each side of a drainage ditches)*.**

Data sources

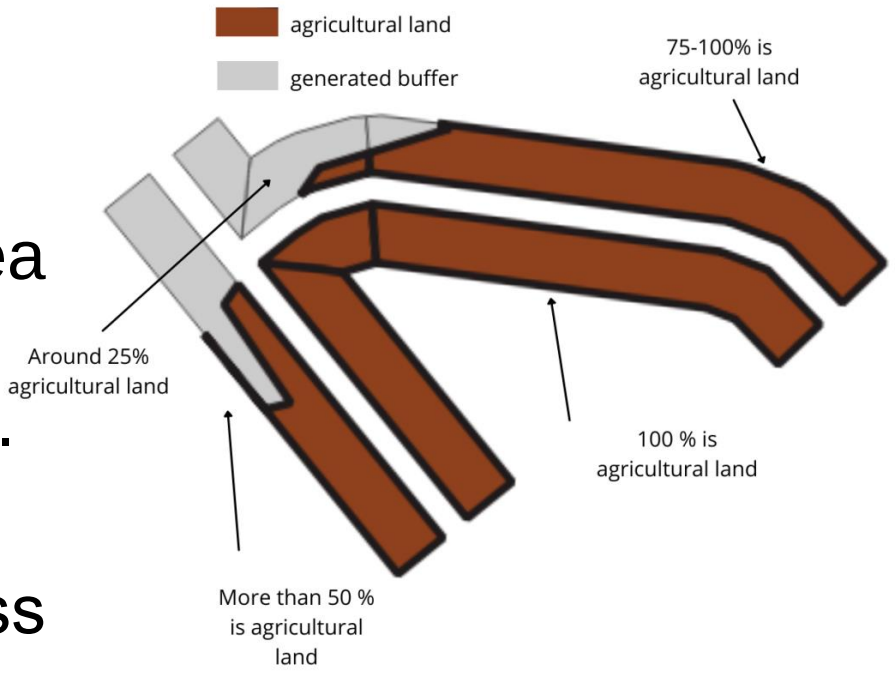
- Land parcel information system of agricultural fields *(actively used farmlands receiving national and EU payments)*.
- CORINE Land Cover (*area of farmlands not receiving national and EU payments*)
- State forest register *(forest lands)*.
- Cadastre of drainage systems *(ditch networks, location of below-ground drainage systems)*.
- Topographical map of Latvia *(road network, other settlements)*.
- Open Street maps *(road network, properties of roads determining protective area)*.
- Digital soil map of Latvia *(soil texture and soil type according to national classification system, properties determining growth conditions)*.

Scope of the study – to determine area and properties of the buffer zones

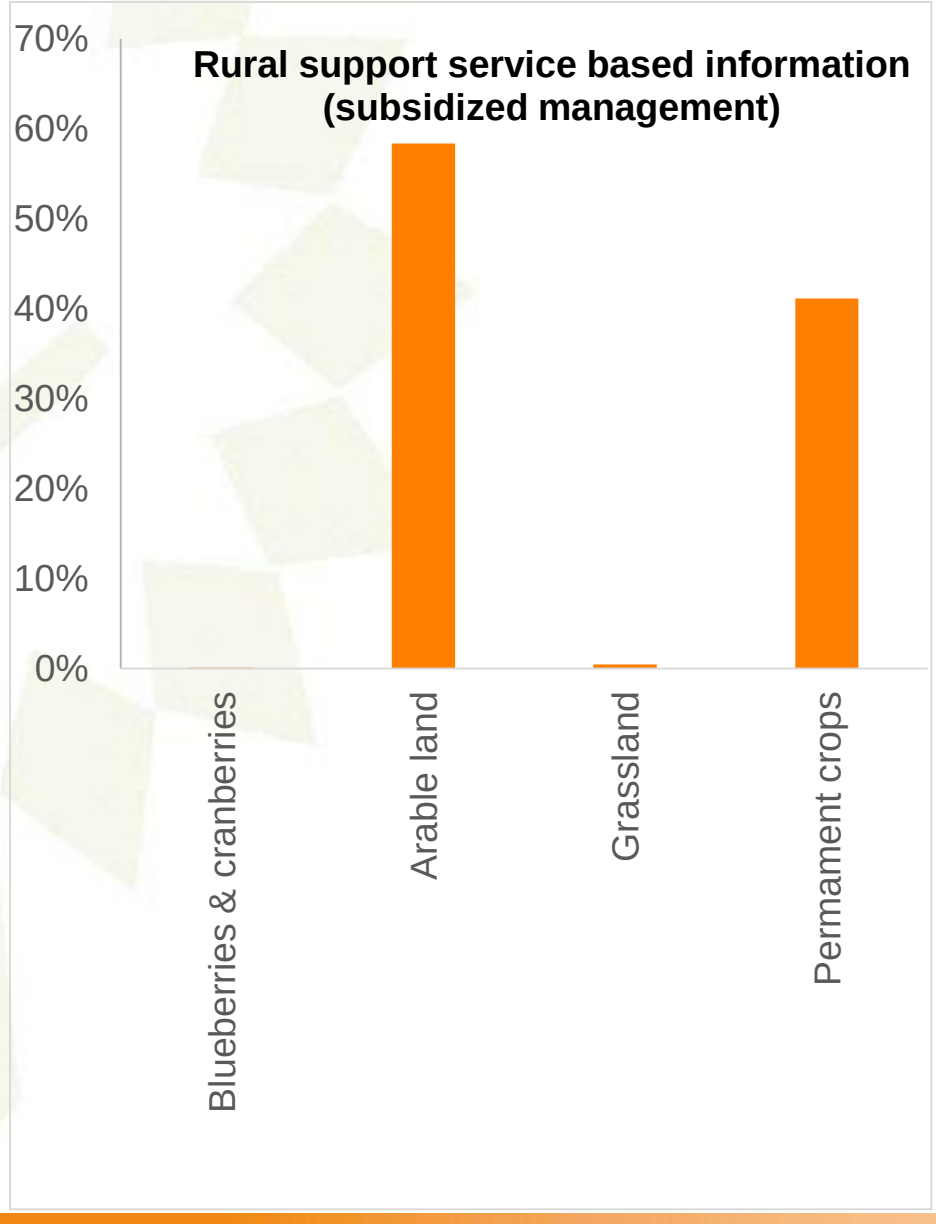
- Spatial data of “buffer zones” suitable for transformation to “biomass factories” covering the whole area of Latvia *(according to cadastre of drainage systems)*.
- Total area of the “buffer zones” in farmlands and areas receiving national and EU subsidies for farming *(will be lost on transformation to “biomass factories” according to current regulations)*.
- Other properties:
  - area of each polygon *(split according dominant direction of drainage ditches)*;
  - direction of drainage ditches *(important for design of a “biomass factory”)*;
  - soil properties in “buffer zones” *(soil texture, organic soils, soil type)*;
  - connections with below-ground drainage networks *(this area will not be planted with trees)*;
  - other areas not suitable for planting of trees *(settlements, protective areas of roads)*;
  - crops currently produced in “buffer zones”.

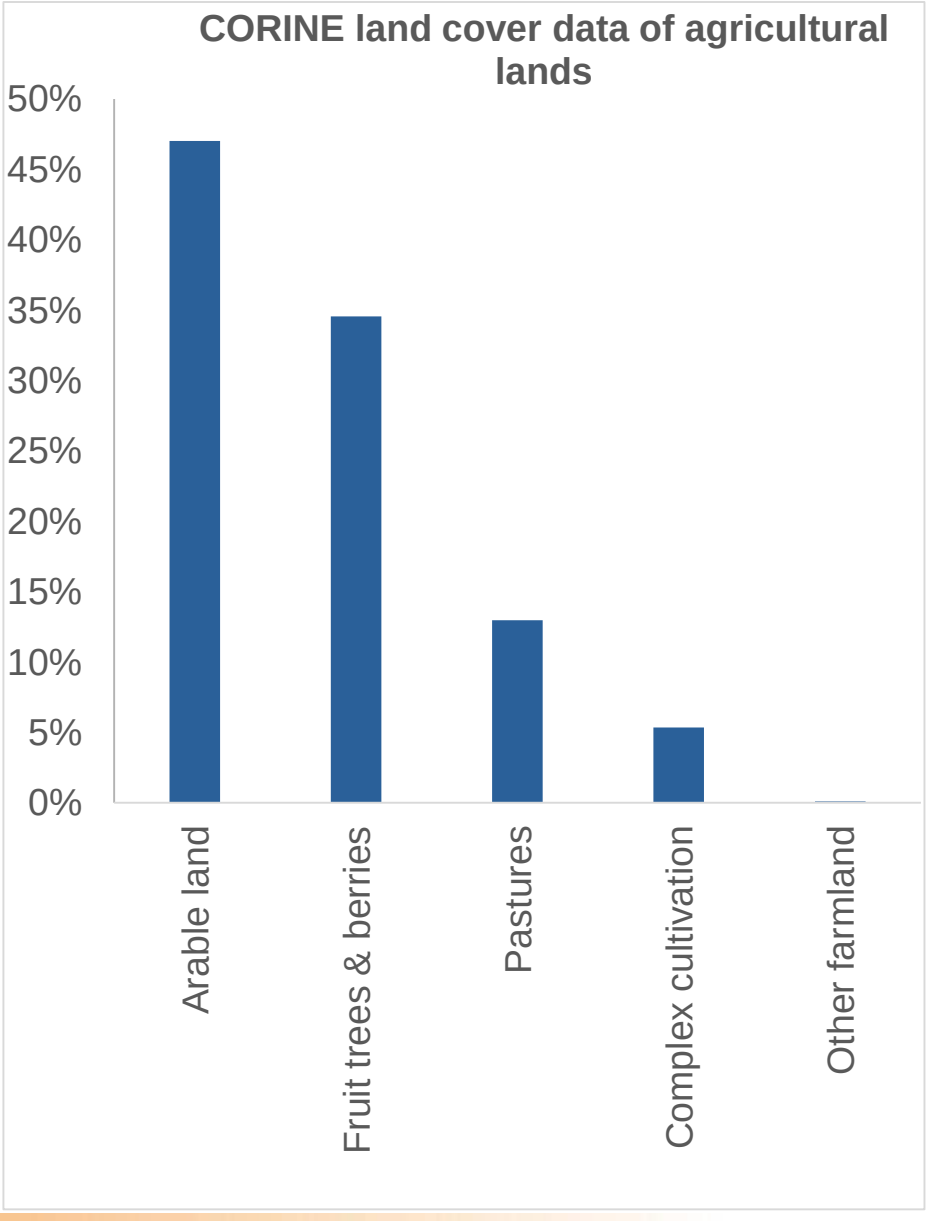
Total area of the “buffer zones” suitable for biomass production

- At least 75% of area of 88% of the identified polygons in “buffer zones” is farmland, the rest of area is overgrown by forest or located in restricted areas.
- The total area of “buffer zones” suitable for biomass production is 104 kha *(4% of the total area of farmlands)*. The average area of polygon is 0.25 ha.

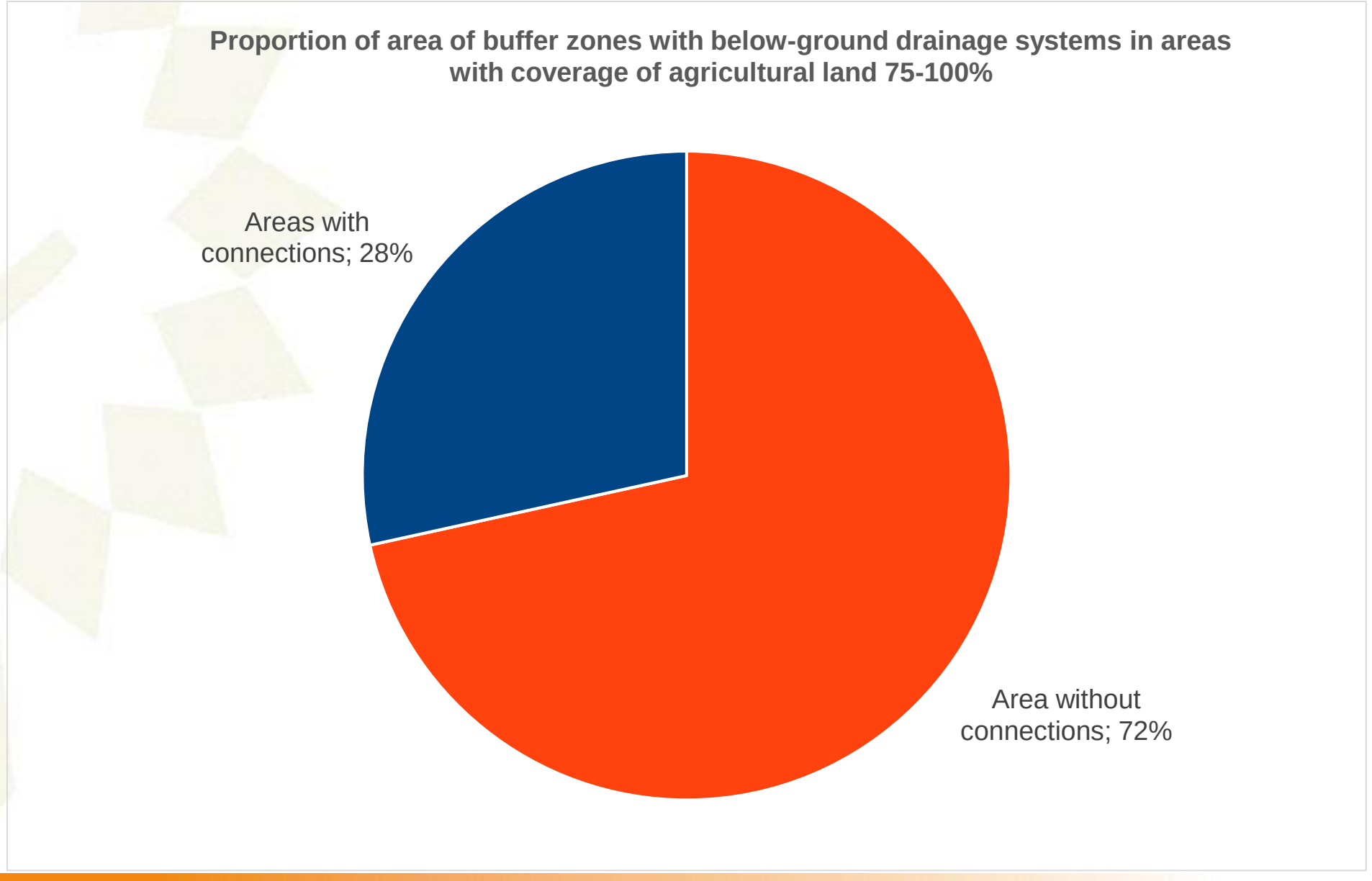


Management of the buffer zones according to different data sources

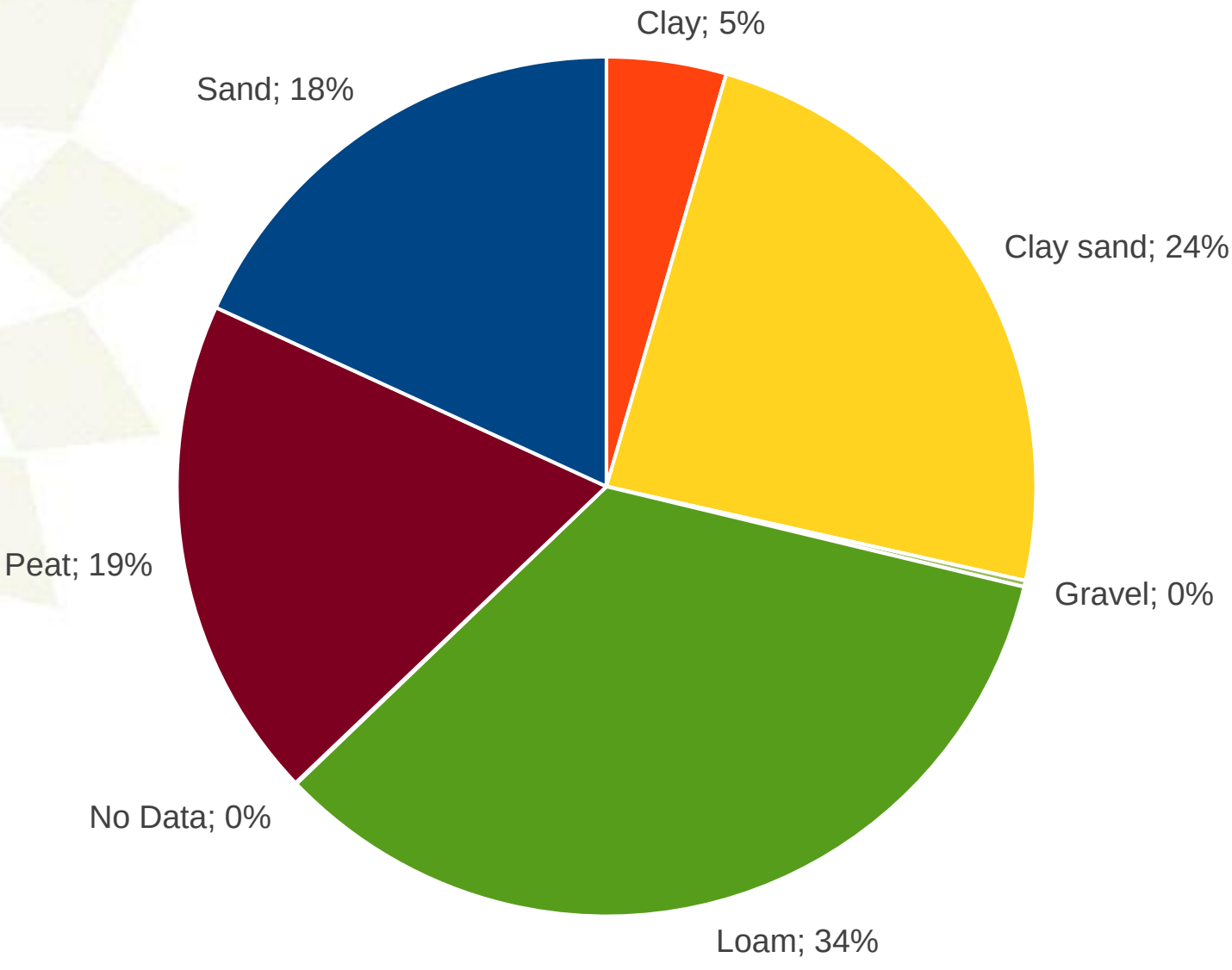




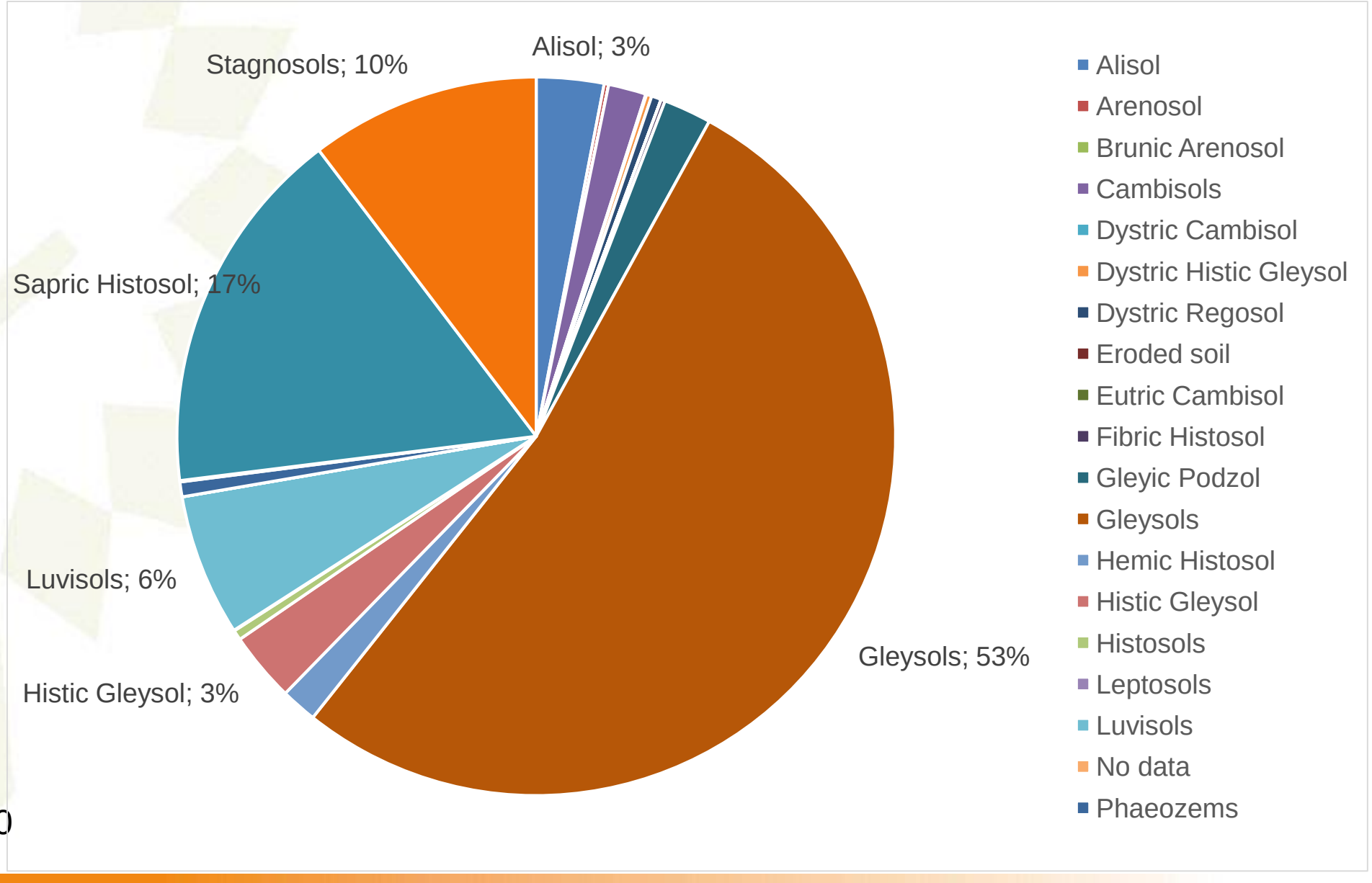
Buffer zones crossing below-ground drainage systems



Soil texture in buffer zones



Soil types in buffer zones



Example of spatial database of the buffer zones for biomass production

GHG mitigation potential of buffer zones, very preliminary

- Mixed plantation consisting of rows of bushes *(Salix sp.)* and hybrid poplar.
- Total planted area – 63 kha.
- Net CO_2 removals – 20 years average – 1.5 mill. tons CO_2 *(14% of the net GHG emissions in Latvia)*.

Following steps

- LiDAR based estimation of drainage ditches not recorded in the Cadastre of drainage systems.
- Sentinel II and LiDAR based estimation of existing woody vegetation on drainage systems and monitoring of development of the “biomass factories”.
- Development of standard design of buffer zones for different growth conditions ensuring full mechanization of the management process.
- Socio-economic analysis, particularly, climate change mitigation effect of the buffer zones.

Thank you for your attention!

Economic & environmental assessment of biomass production in buffer zones around drainage systems and territories surrounding the protective belts of natural water streams, No. 1.1.1.2/VIAA/3/19/437