



Graph theory applied to agroforestry system co-design

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Graph theory applied to agroforestry system co-design



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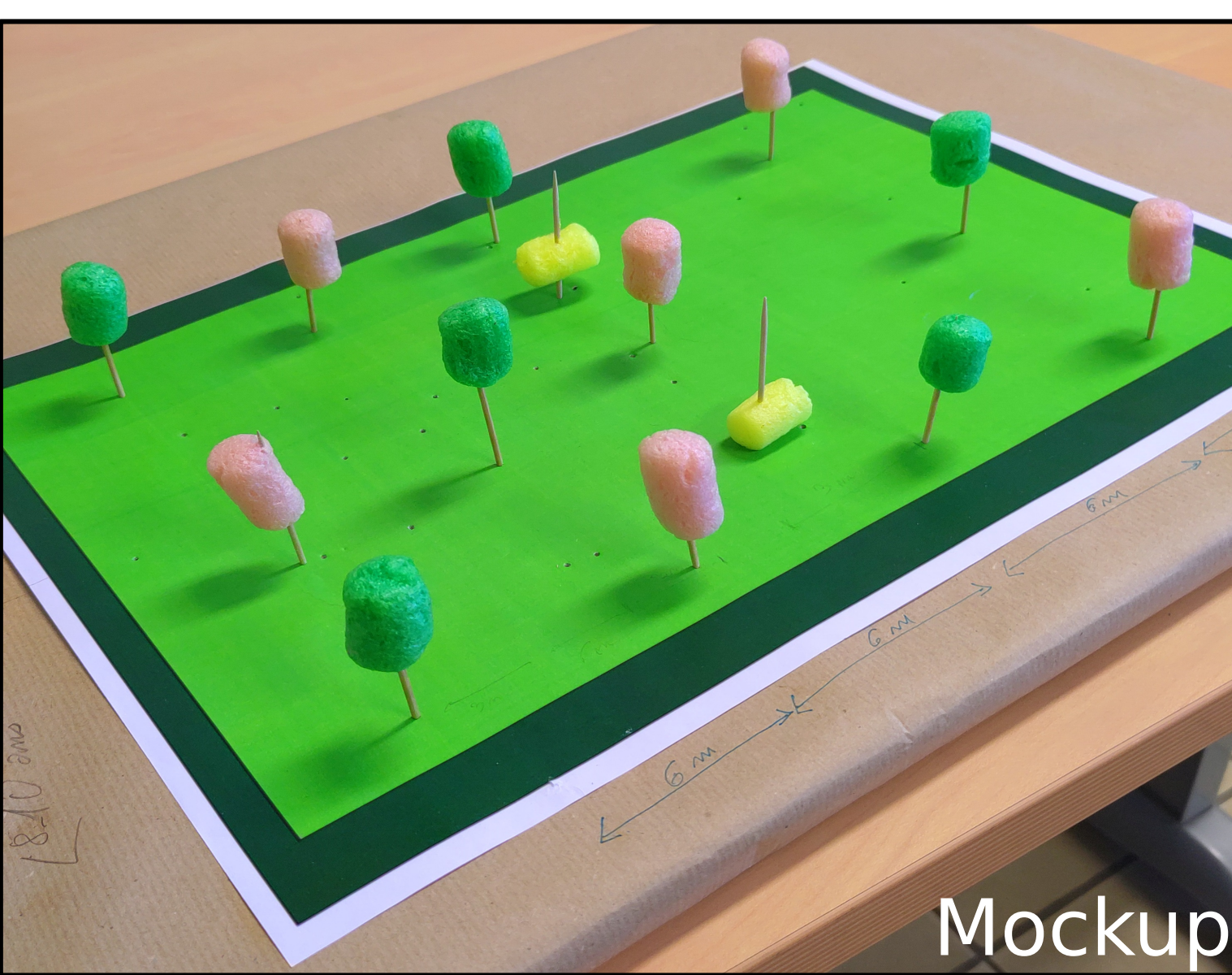
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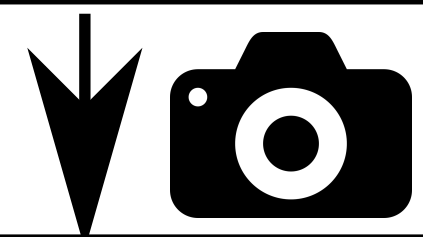
AMAP, Univ Montpellier, CIRAD, CNRS, INRAE, IRD, Montpellier, France

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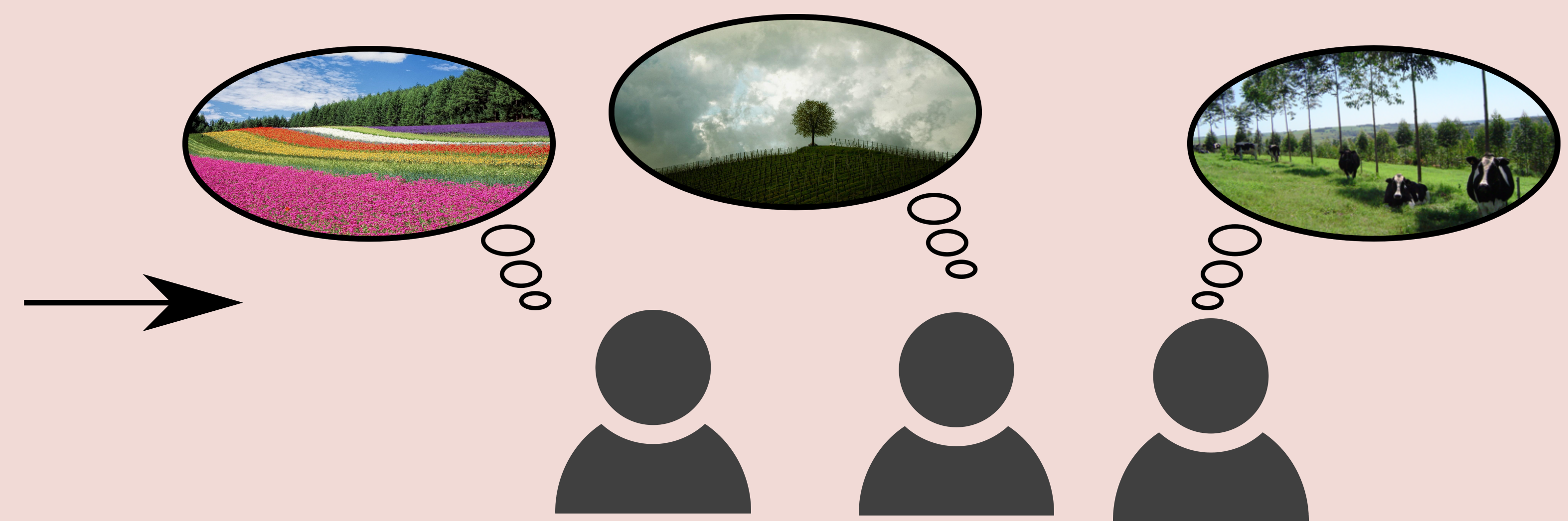
contact : laetitia.lemiere@inrae.fr



Mockup

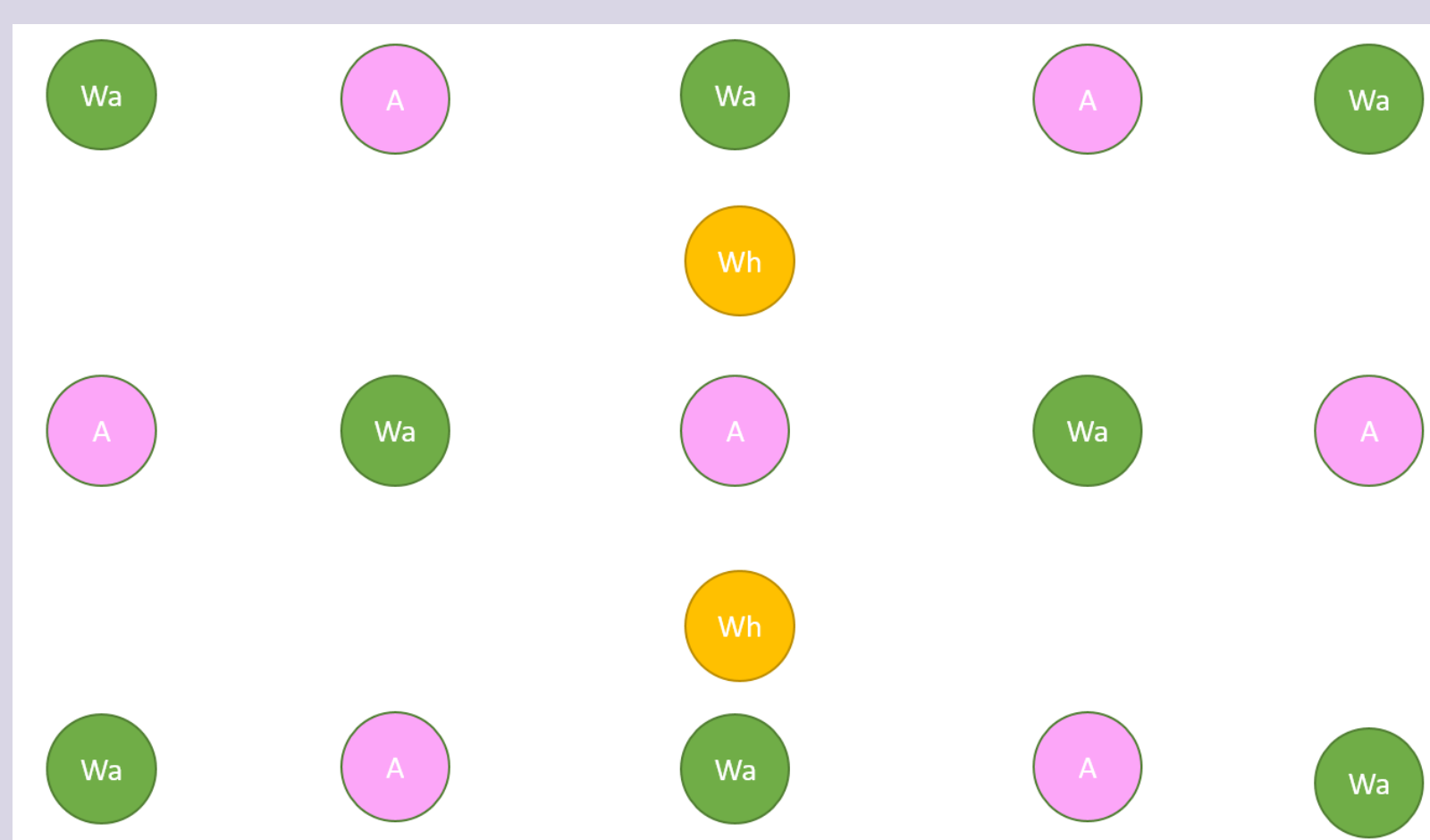


Traditional way



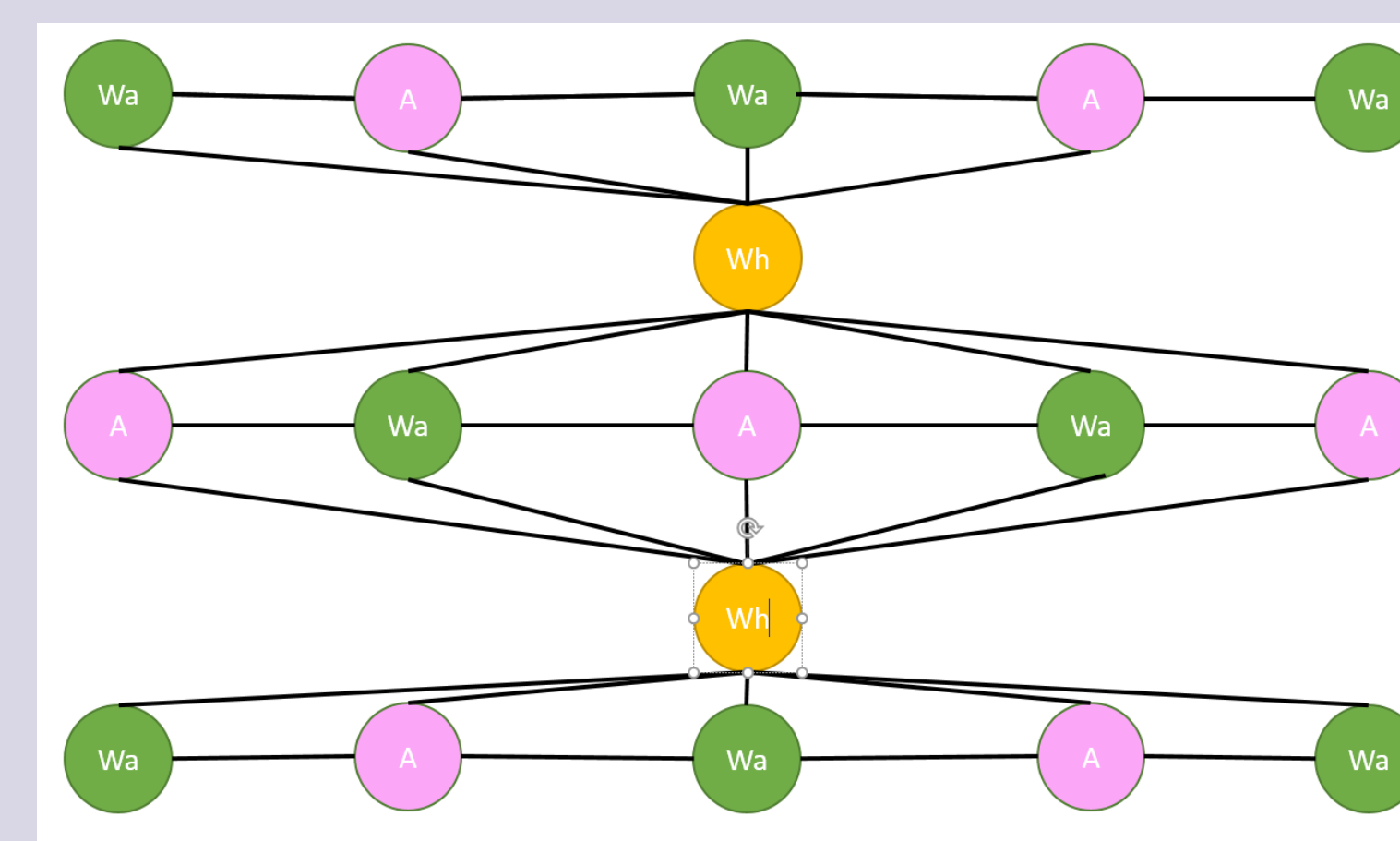
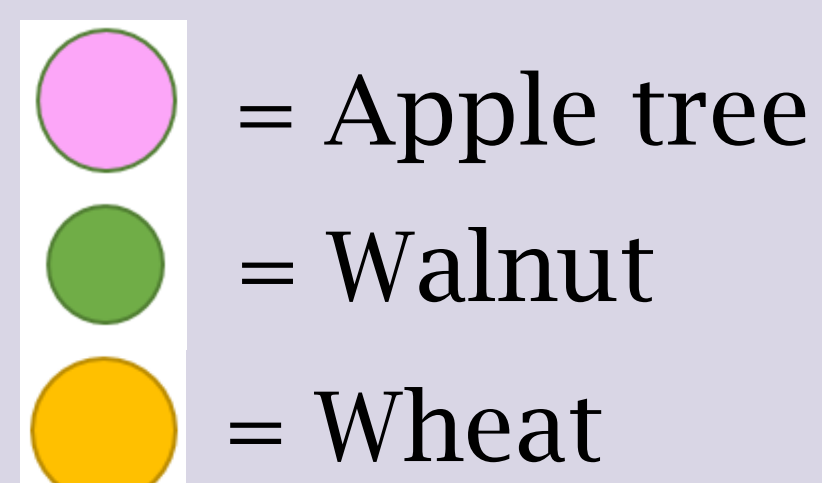
(Space and time) Designs are not easy to share

Our method

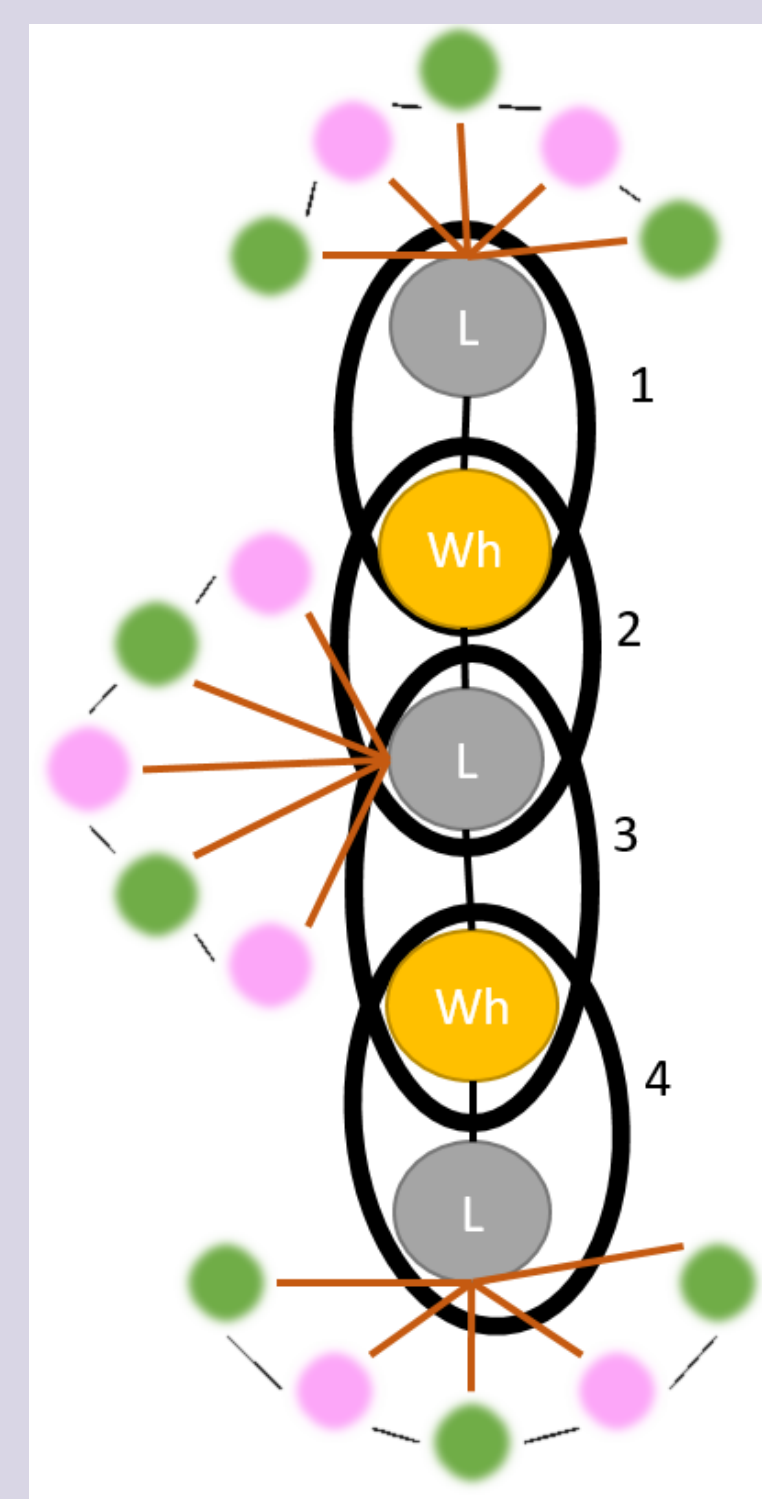


Processed **digital twin** of the mockup

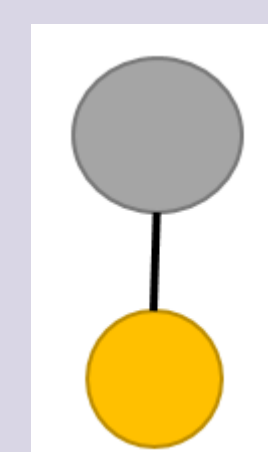
Each element is transformed into a node



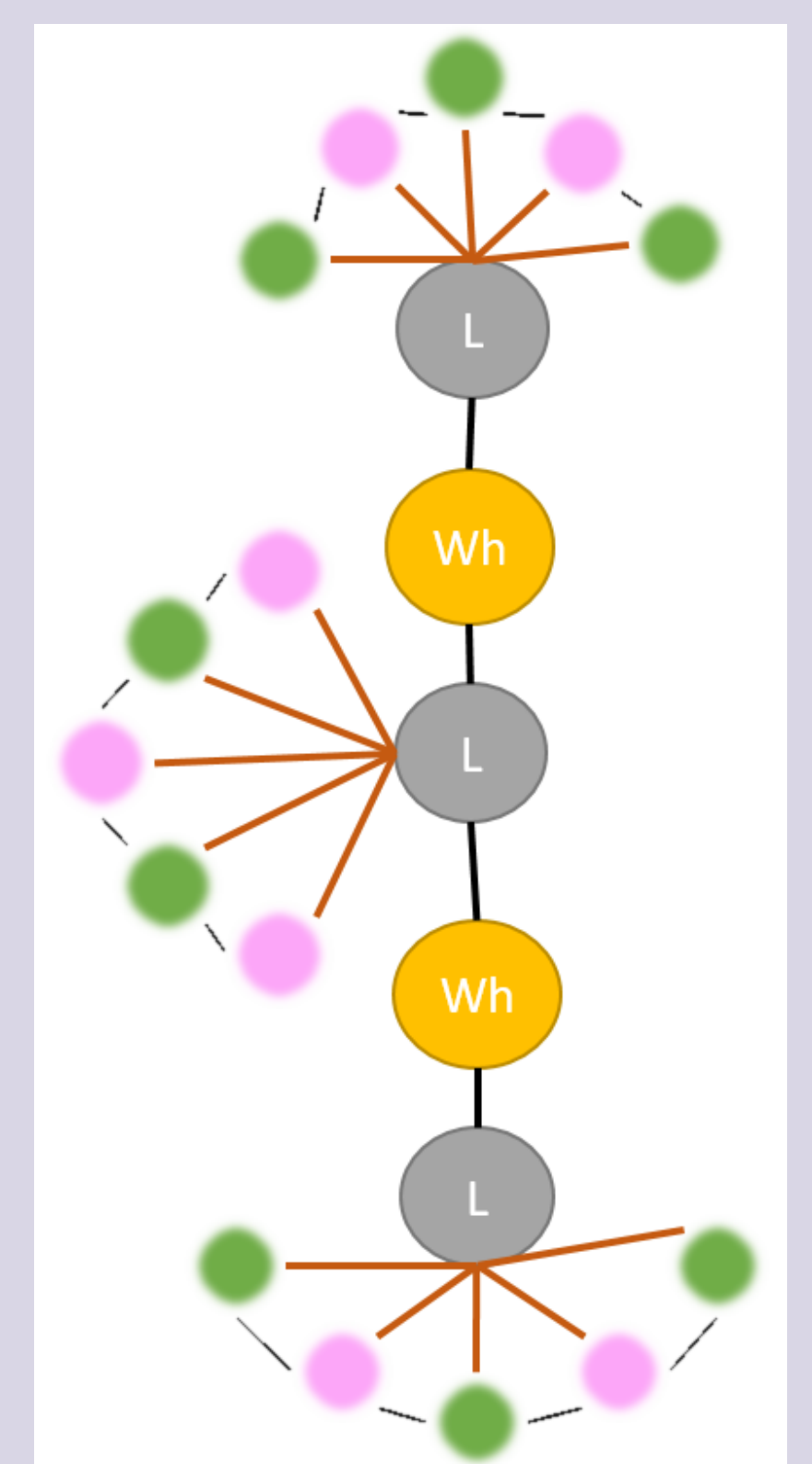
Digital twin is translated into a **graph**
2 elements are neighbors -> an edge



Search of known patterns
1 pattern = structure supporting ecosystem services



= limiting water stress by tree shadow



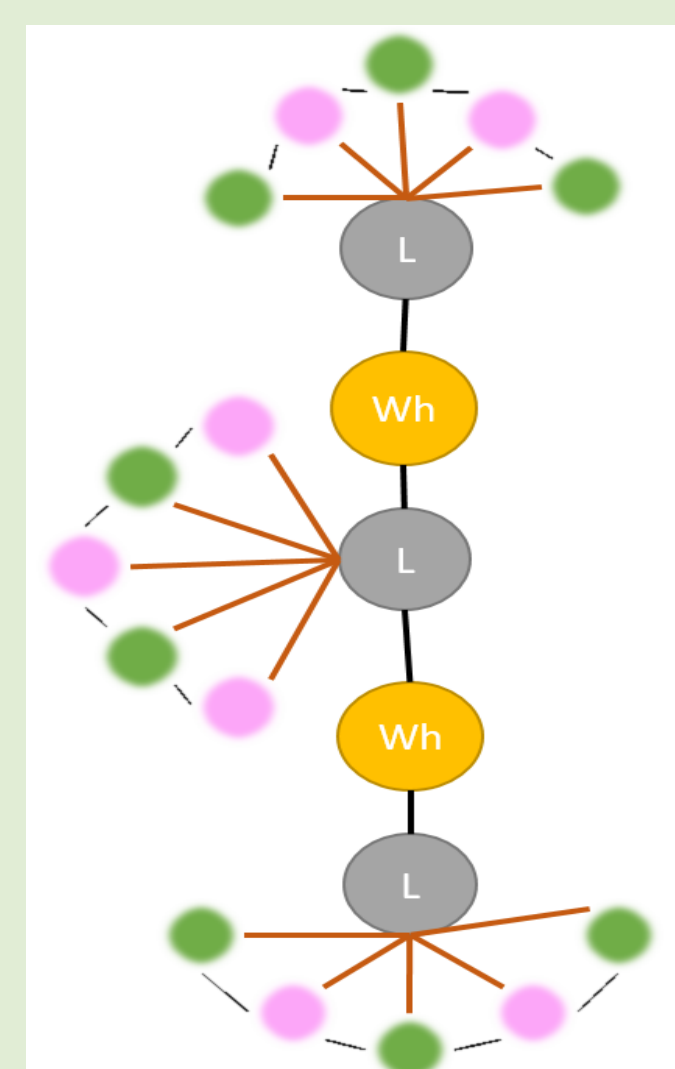
Hierarchical graph

Higher level elements are identified

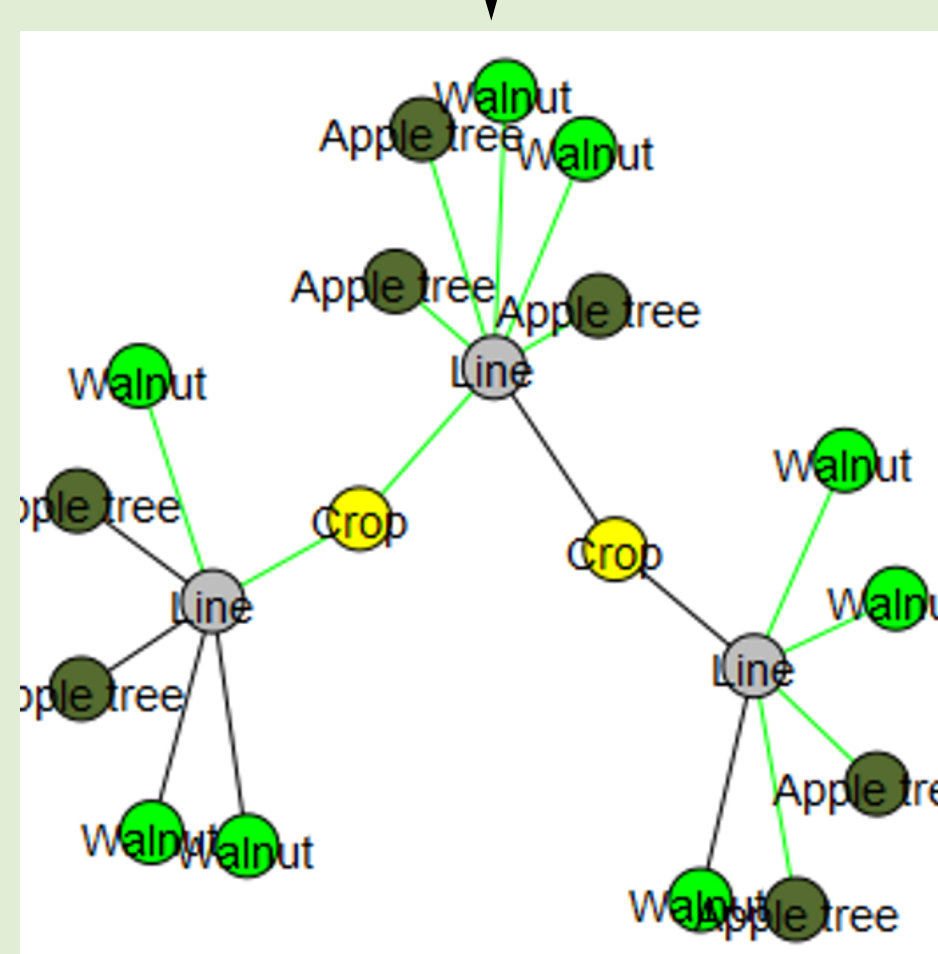
● = vegetal cover

Visualization of the agroforestry system
with ecosystem services

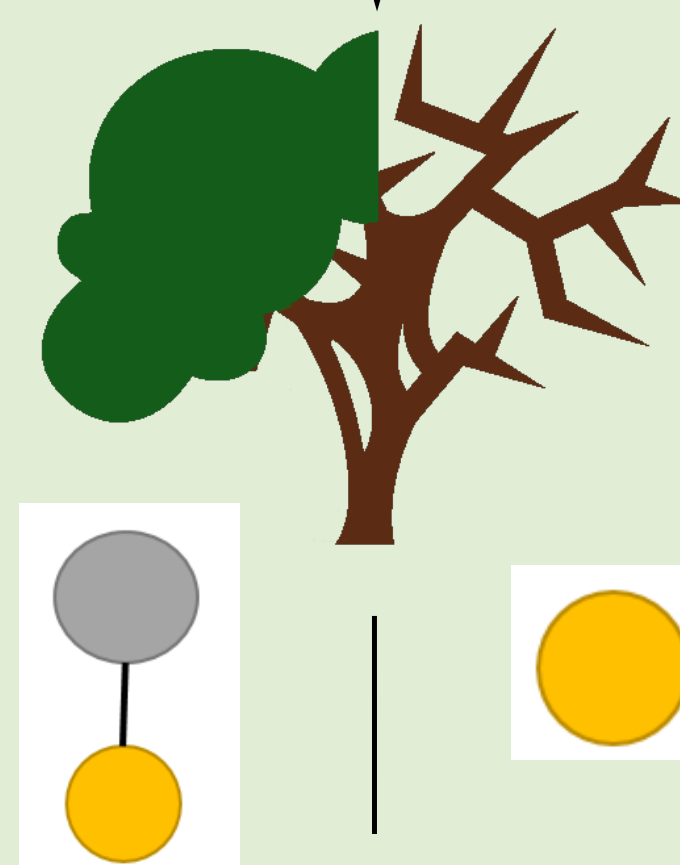
Results and discussion



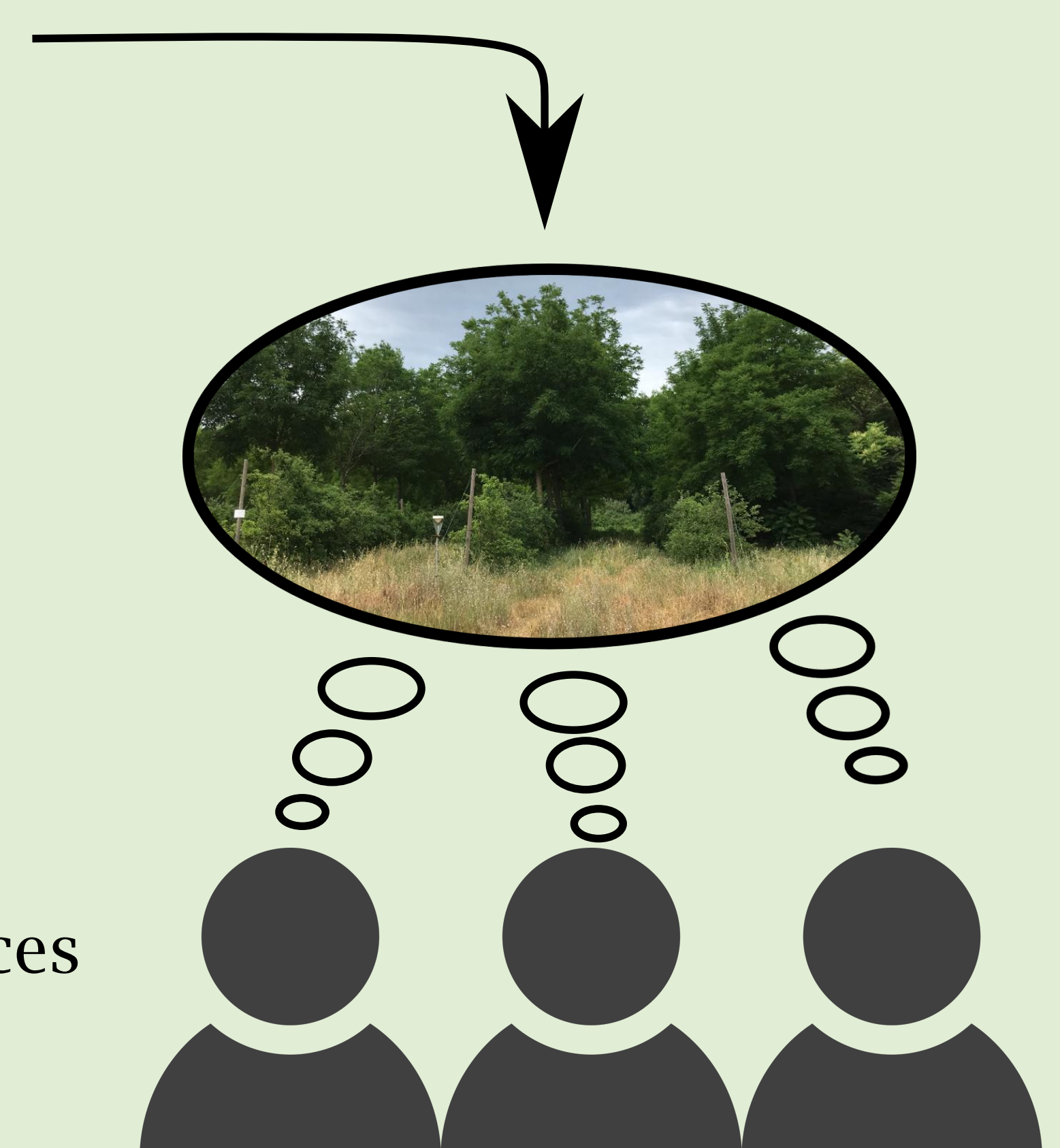
To **compare** agroforestry systems



To model **temporal evolution** of ecosystem services



Better knowledge of the system



To **share** a more precise
common view

A novel way to describe agroforestry systems
based on graphs