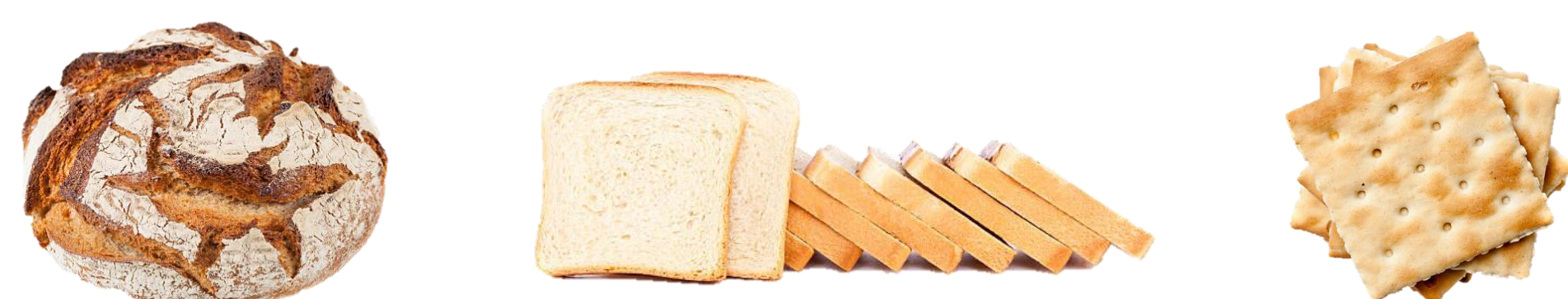




Variability of grain albumen minor components and technological quality of wheat

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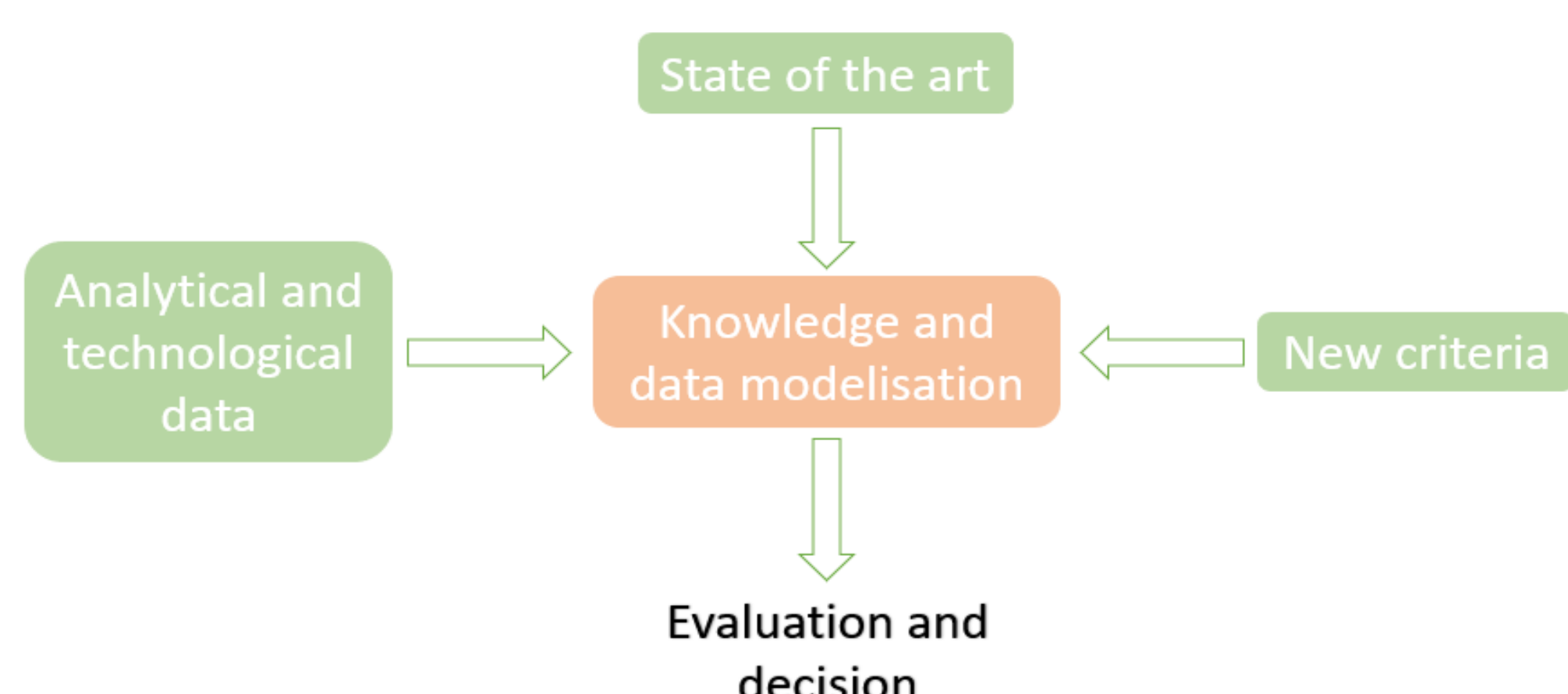
Context



Technological wheat quality can be defined as its ability to meet the specifications needed for a given end-use. But this quality assessment is **becoming more challenging due to climate change, agro-cultural practices and changing societal demands.**

EVAGRAIN is funded by the French National Research Agency and coordinated by the INRAE research unit BIA. **The aim of this project is to design a Decision Support System (DSS) that would be able to give a quality assessment of wheat for various end-uses in the industry.**

The project brings together 10 academic and private partners that will collect a dataset on 150 wheat samples provided by millers with several different varieties and/or growing conditions throughout France and for 2 years (2021 and 2022).



Goals of the thesis

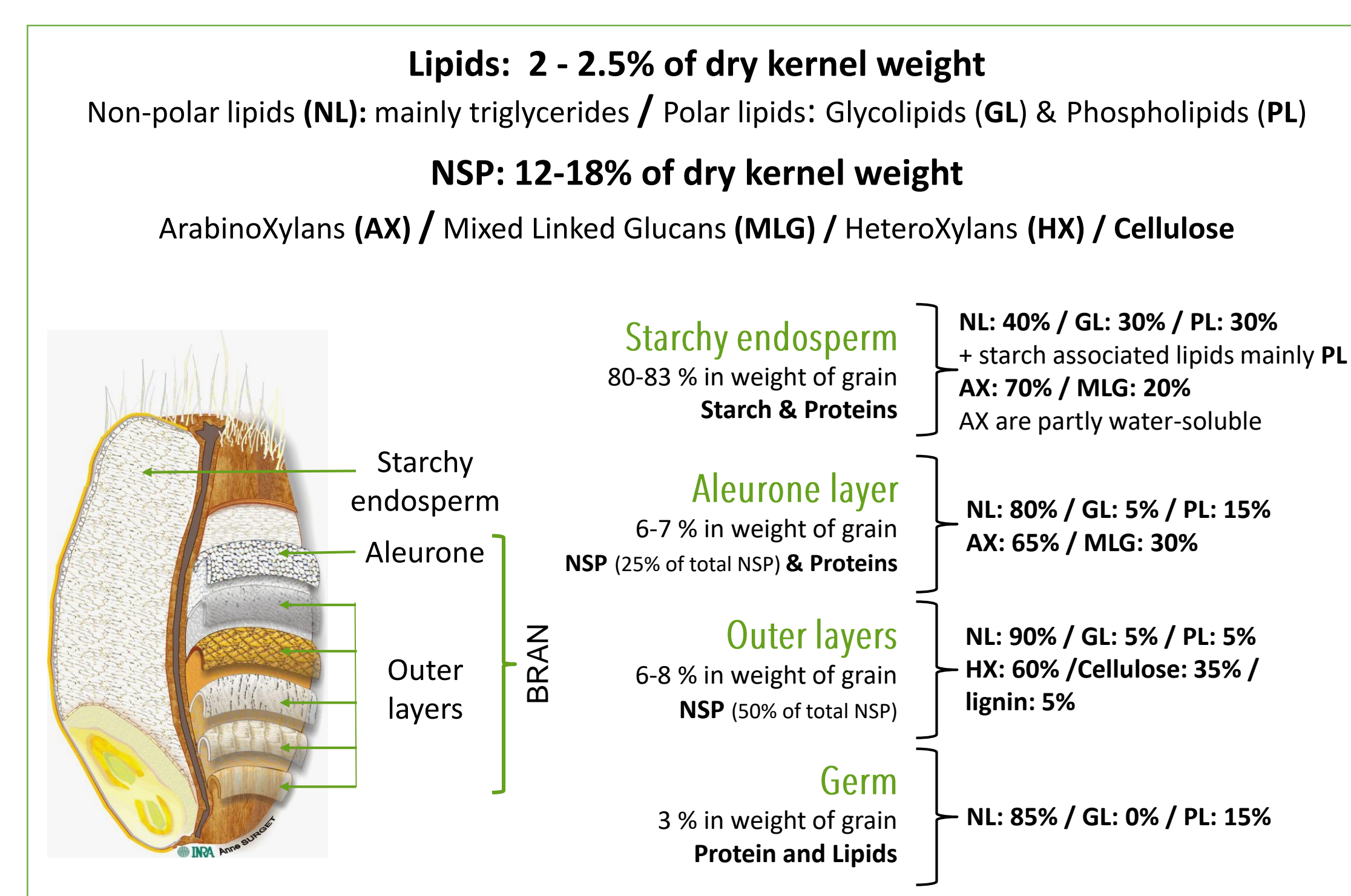
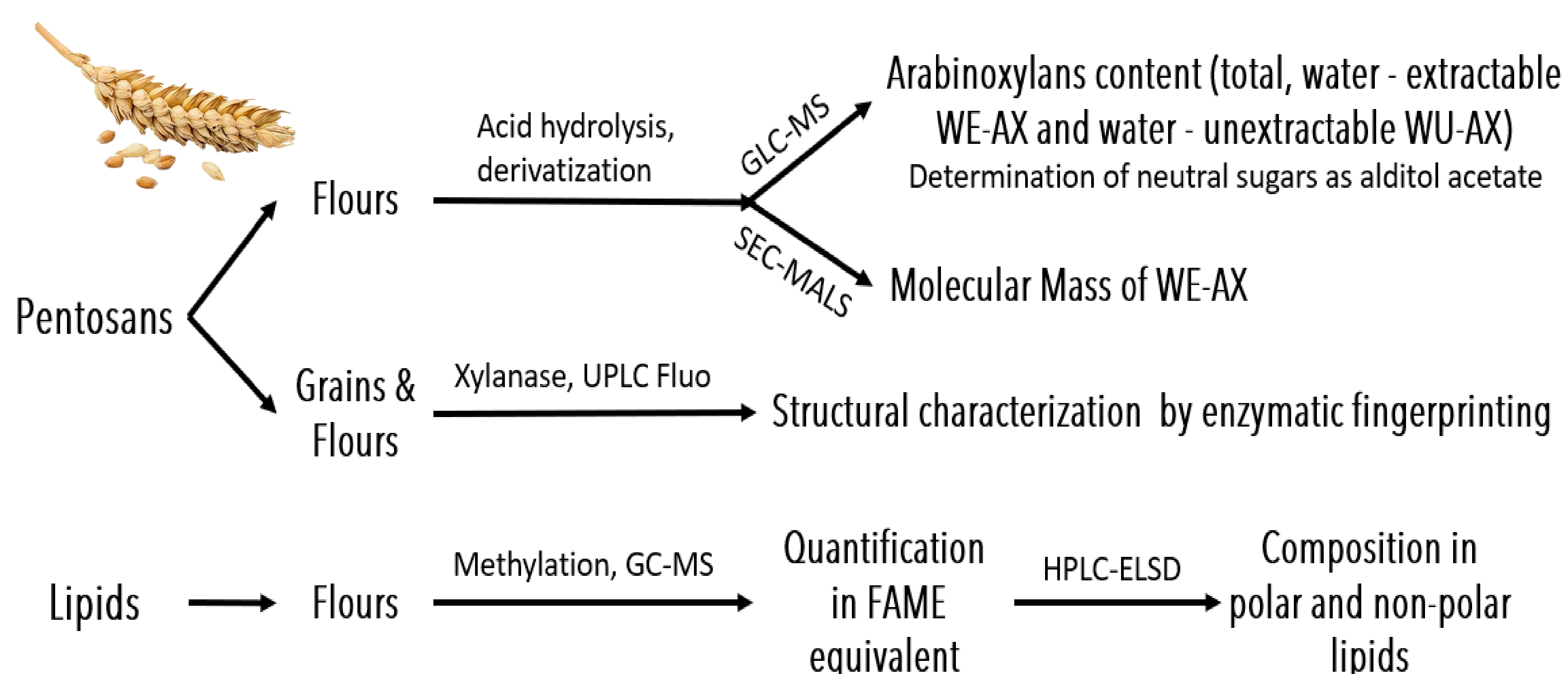
Many studies worked on the genetic and environmental impact on components of wheat grain but mainly focusing on starch and protein. Although these components have a proven role in bread making, **minor components, such as lipids and pentosans** should also take as much attention.

Indeed, lipids have ability to interact with starch polymers and proteins, and have multiple impacts on the dough properties.

Pentosans, which are cell wall polysaccharides, are known for their strong water retention capacity, and water control is crucial in bread making.

The thesis is part of EVAGRAIN project by **integrating new wheat evaluation criteria** through the study of these minor components of wheat flour.

Characterization of minor components



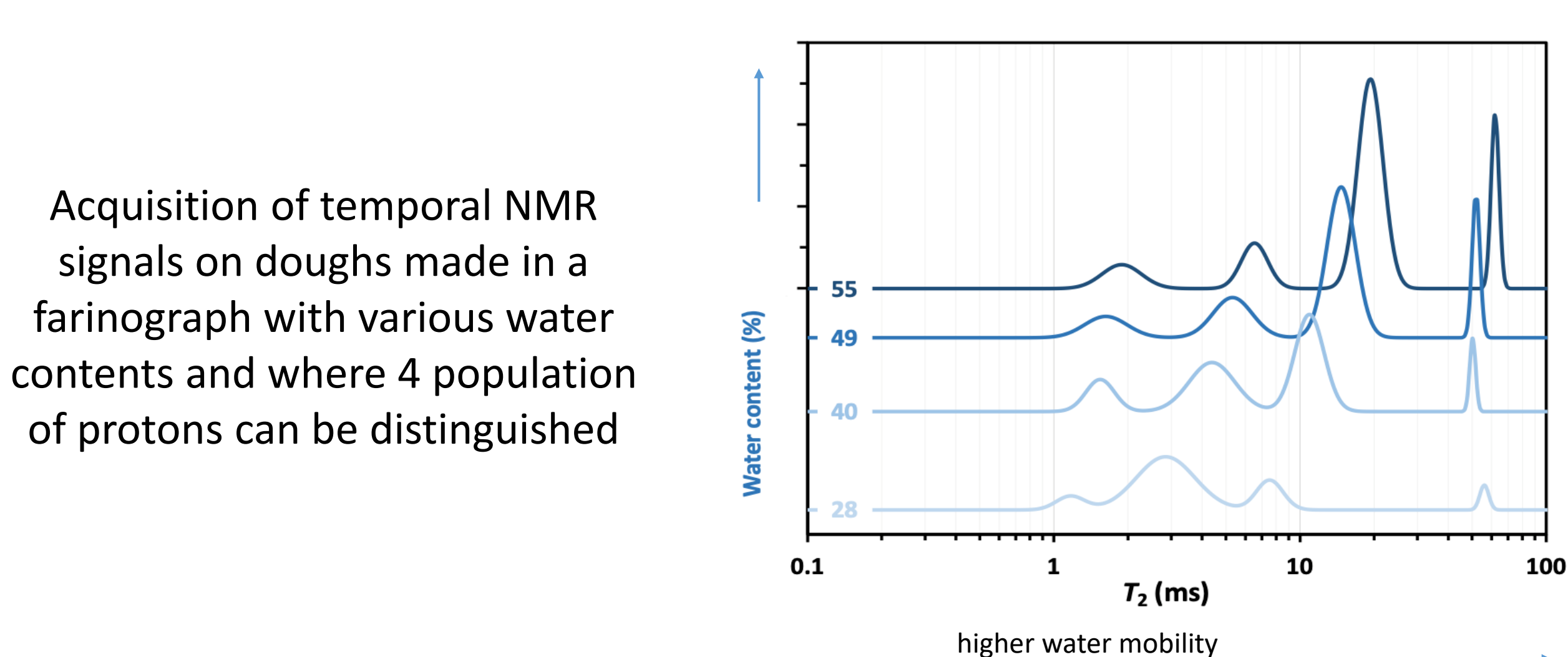
Water state tracking

An other part of the thesis will be to study **water distribution and mobility in the flour using NMR Relaxometry.**

During the NMR experiment, energy is brought to the hydrogen atoms of the sample, which return to equilibrium by exchanging energy with the surrounding atoms according to different relaxation time.

Using CPMG sequence, measurements of T2 relaxation times reveal populations of water with different environments/mobilities in the samples.

The goal is then to reveal possible connections with pentosan characterizations.



Validation and data selection

Thanks to multivariate analysis :

- Identification of the most significant criteria able to discriminate samples among the 150 wheat samples.
- Selection of the most different samples to further investigation e.g. water state and rheological properties of dough.
- Establish relationships between potential wheat quality criteria and data collected by the others partners of EVAGRAIN.

Conclusion



This work will provide a **better understanding of the role of minor components on the quality of grain products** in the frame of EVAGRAIN project. The interconnection of the data and knowledge will allow to create a Decision Support System and determine the most relevant wheat quality criteria for a given use.