

INTRODUCTION

Cropping system (CS) ⇔ Crop sequence + Crop management → A relevant scale to deal with pests, nitrogen management, etc.

Information about current cultural practices widely gathered at cropping season scale → A need from public policy makers to better know the current CS.

Aim of the study → Creating a CS typology from a crop-oriented survey, assuming that crop management of a given crop depends on the crop sequence.

MATERIAL & METHODS

A public dataset:

<http://agreste.agriculture.gouv.fr/enquetes/pratiques-cultureles>

→ **100-200 plots per region for each crop** (wheat, barley, triticale, oilseed rape, sunflower, pea, corn)

→ **Detailed crop management plan (CMP)** in 2011 (soil tillage, sowing practices, fertilization, pest management, irrigation...)

→ **Additional information about 2006-2010** (sequence of crops, manure and plowing practices)

Analysis ⇔ A typology combining two classifications (Fig. 1)

Step 1 → classification of 2011 CMP for each single crop

Step 2 → classification of 2006-2010 information all crops mixed up

Step 3 → combining both classifications

Each classification combine factor analysis (FA) and hierarchical clustering (HC)

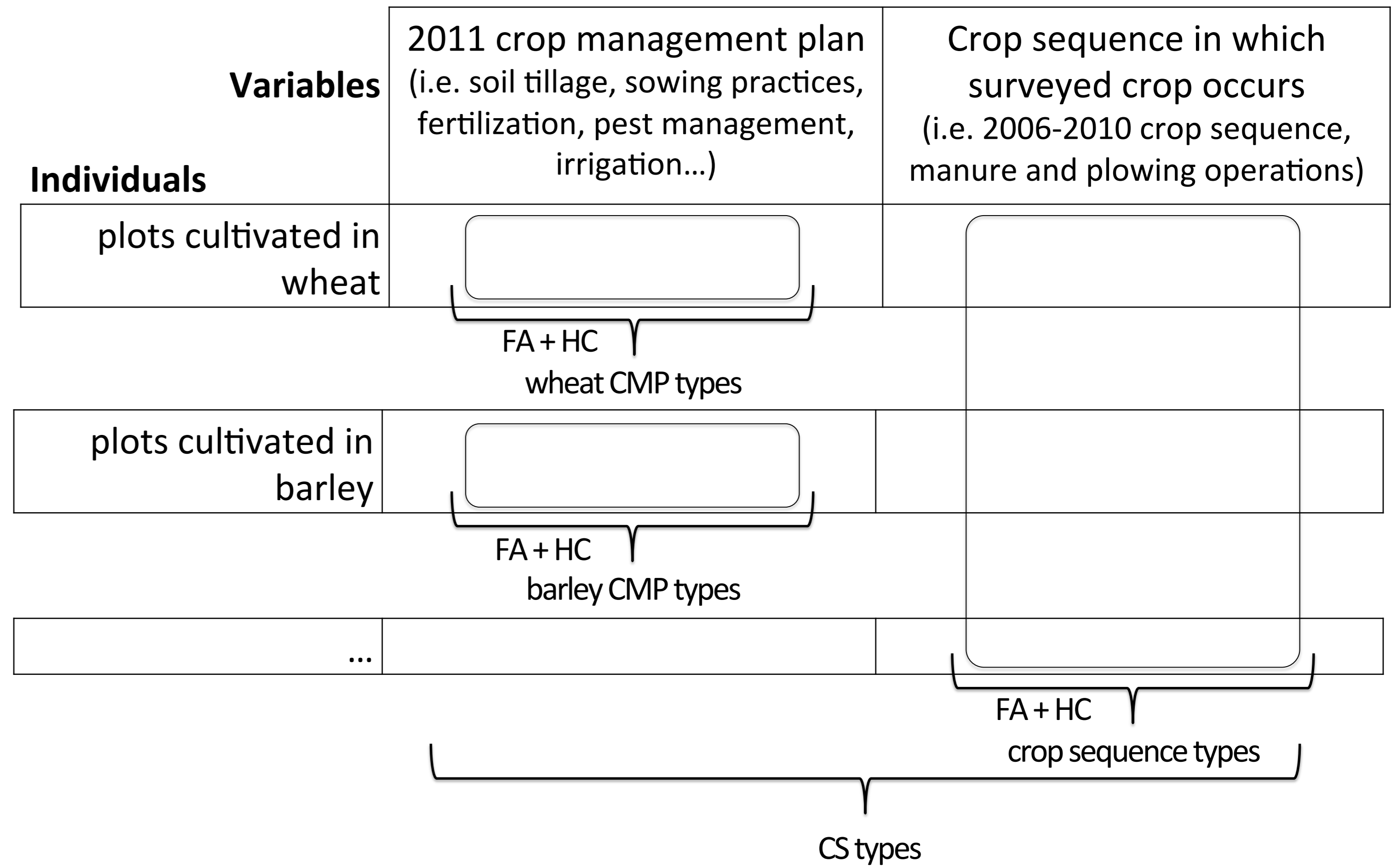


Figure 1: Overall analysis approach to build a cropping systems typology

RESULTS

Example of the Bourgogne region (middle east of France)

→ **9 crop sequence types** ⇔ 50% of the sample (Tab. 1)

→ The major crop sequence in the Bourgogne region ⇔ 18% of the sample

→ A sequence of three crops: oilseed rape, winter wheat, winter barley

→ For each crop, 1 or 2 dominant CMP types, among 3-4 (Tab. 2)

(« dominant » ⇔ CMP type gathering at least 30% of the sample)

→ 2 CS derived, differing on the winter wheat CMP type (Fig 2)

Table 1: Crop sequence types gathering 50% of the sample in the Bourgogne region

| | |
|--|------------|
| Oilseed rape followed by at least 2 years straw cereals, low plowing and manure frequencies | 18% |
| Crop sequences with meadows | 6% |
| Straw cereals monocropping, high plowing frequency | 5% |
| Oilseed rape and grain legumes rotating with straw cereals, low plowing and manure frequencies | 4% |
| Oilseed rape followed by at least 2 years straw cereals, high plowing frequency | 4% |
| Corn followed by at least 2 years straw cereals, high plowing and manure frequencies | 4% |
| Oilseed rape and sunflower rotating with straw cereals, low plowing and manure frequencies | 3% |
| Corn monocropping, high plowing frequency | 3% |
| At least 2 years corn followed by straw cereals, high plowing frequency | 2% |

Table 2: Distribution of plots by CMP type for each crop of the major crop sequence type of the Bourgogne region « Oilseed rape followed by at least 2 years straw cereals, low plowing and manure frequencies » (High / Intermediate / Low is to understand in comparison to other CMP types)

| Crops | Oilseed rape | Crop management plans | | |
|---------------|--------------------|---------------------------------|-------------------------------|-----------------------|
| | | Intermediate input with plowing | Intermediate input no plowing | High input no plowing |
| | | < 30% | < 30% | 54% |
| Winter wheat | Low input | Intermediate input | High input with plowing | High input no plowing |
| | | < 30% | < 30% | 53% |
| | | | | 42% |
| Winter barley | Intermediate input | High input with plowing | High input no plowing | |
| | | < 30% | < 30% | 59% |

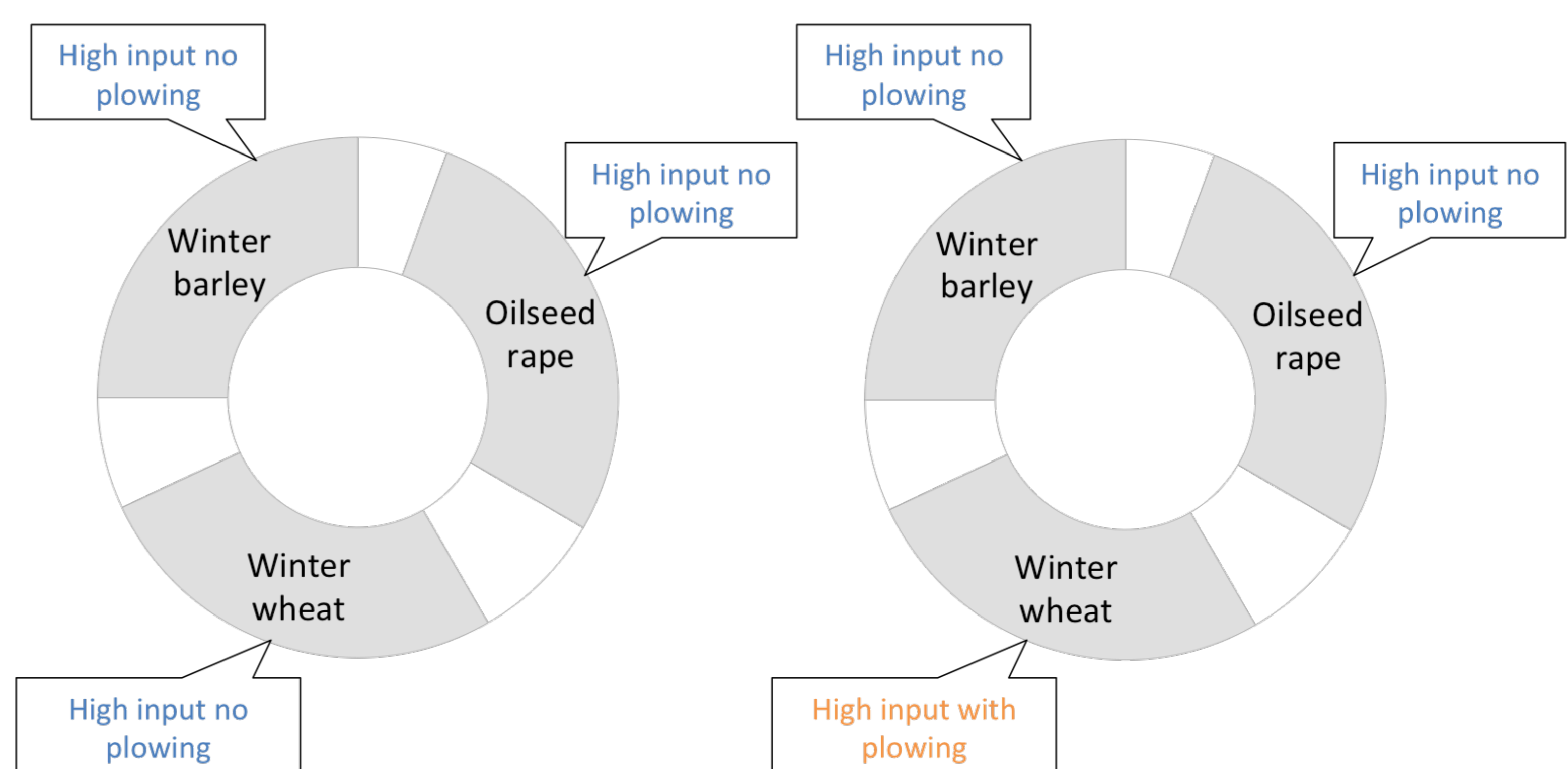


Figure 2: Cropping systems derived from the crop sequence type « Oilseed rape followed by at least 2 years straw cereals, low plowing and manure frequencies »

CONCLUSION & PERSPECTIVES

A cropping system typology has been produced for three French regions. In each one, 20 to 34 CS gathering 50% of the sample have been described.

It aimed at helping design and assessment of scenarios for scaling-out legume-based CS. On targeted territories, several prospective scenarios introducing innovative legume-based CS have been designed with the help of local stakeholders. Impacts of these scenarios have been assessed in comparison to a baseline, given by the typology of the current dominant CS of each territory.

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