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Tillage strategies to optimize rapeseed establishment: a method to support decision making

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In France, winter oilseed rape (rapeseed) is the second arable crop in terms of cultivated areas, and also in terms of treatment frequency index and nitrogen applied per hectare. However, rapeseed is able to withstand the presence of pests provided a sufficient growth in autumn. Obtaining such a 'robust' rapeseed, weakly dependent on pesticides, implies a satisfactory emergence and no factors limiting the growth in autumn. Soil tillage plays a key role in getting these states, but its effects can be antagonistic. It thus has to be adapted to each field condition in order to optimize rapeseed establishment and growth in autumn.

The aim of this study was to develop a method to support farmers in choosing adapted tillage practices, based on expertise and tests and improvement loops with farmers, who were part of an innovation network. The farms were located in central France, in a semi-oceanic climate. Four criteria were selected and prioritized to help choosing adapted tillage strategy: (i) soil structure, (ii) straw management, (iii) weed and pest pressure, (iv) soil behavior. Three decision trees, corresponding to three main soil types (clay soils, sandy loam soils, and balanced soils), were built to take into account these four criteria and to come up with an operational advice. The implementation of the method included three steps: (i) collection of information on the field, (ii) observations and soil structure diagnosis in the field, (iii) decision-making using decision trees.

This method was implemented for three years in the farmer's group described above. Beyond the individual optimization of tillage practices, farmers claimed that this method was an opportunity to exchange with peers and advisors on the agronomic levers of field management.