## The "Robust Sunflower" dashboard, a decision support tool for sunflower crop establishment strategy

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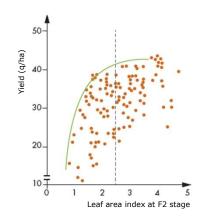
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## Introduction

Crop establishment is a key stage in the success of sunflower cultivation. This sequence is decisive in obtaining a robust sunflower, which Terres Inovia defines as being able to express its yield potential by not being limited nor by its stand, nor by its leaf area, nor by its rooting.

The Institute's monitoring and support work with 3 groups of farmers located in several French production zones, focusing on the theme of sunflower establishment between 2019 and 2022, enabled us to show that the margins for technical progress in all the operations implemented by growers to establish sunflower were substantial. Another finding was the lack of an operational tool for growers and advisors to manage sunflower establishment and evaluate its success.

Facing these observations, the Institute mobilized its expertise and led a process of co-design of the tool with practitioners to develop the "Robust Sunflower" dashboard (figure 3), which can be used by all French agricultural advisors and growers, to promote successful sunflower establishment.



1. Link between leaf area index at flowering and yield obtained by sunflower – CETIOM trials 1983-1990

# % soil coverage Yield (%/control) 100 100 75 88,3 75 88,3 75 87,8 76 76 76

2. Illustration of the impact of stand heterogeneity on sunflower production – CETIOM trials 1983-1990

## Material and method

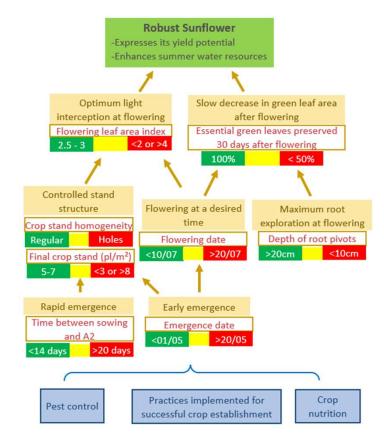
The "Robust Sunflower" dashboard is a strategic tool designed to guide the technical decisions for crop establishment and help growers achieve robust sunflower status. Seven intermediate stages, called "key stages", decisive in reaching this final objective, have been defined

To formalize these key statements and design the dashboard, we drew on i) our expertise, acquired through projects carried out since the creation of the Institute (e.g. DIASOL) on sunflower establishment and its ideal growth path, ii) on the results of factorial trials dedicated to this theme (see examples in figures 1 and 2), iii) and on a monitoring of 80 plots under real agricultural conditions. A dedicated working group has been set up between 2021 and 2023 to build the tool.

### **Results and discussion**

The dashboard's key stages are assessed throughout the production season using indicators derived from field observations, such as dates when certain key stages are reached, phenological indices or yield components, to be carried out by the practitioners themselves directly on the crop. The key stages are linked by cause-and-effect relationships, enabling a detailed analysis at the end of the campaign of the mechanisms that led to the successes and failures in obtaining a robust sunflower, for each single field. The cultivation practices implemented by growers can then be assessed in terms of the extent to which key stages and the final objective have been achieve. In the event of failure, areas for improvement can be identified. The dashboard can also be used before the start of the campaign, to help build a strategy based on the formalization of cause-and-effect links between practices, key stages and the final result.

The tool's configuration makes it adaptable. In fact, the indicator evaluation terminals, and the indicators themselves, can be adjusted according to the production context. Thus from 2023 onwards, we will continue to monitor plots within several farmer collectives, in order to obtain a wealth of feedback that will enable us to test the tool and continuously improve it.



3. Terres Inovia "Robust Sunflower" dashboard, published in 2023



