QuantiFarm Toolkit –
Directions for using the "Recommendation tool" V2.0

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Main functionality

The Recommendation Tool V2.0 is an interactive tool that allows farmers and farm advisors to search through a large set of available Digital Agricultural Technology Solutions (DATSs) using natural language text and filters for available DATS parameters and ask for a recommendation for one or more DATSs that match specific characteristics of the farm and farmer. The Recommendation Tool aims to be easy to use and the farmer shouldn't need special training or extended help from the advisor. Technically, the tool is based on a knowledge-based recommender system using a combination of reasoning and constraint satisfaction to provide a ranked list of the most suitable DATSs for any given farm/farmer profile.

The Recommendation Tool is available here: [QuantiFarm Toolkit](#)

More specifically, with the Recommendation tool, a user can:

1. Get information about the available Digital Agricultural Technologies Solutions (DATSs),
2. Search and filter through the available DATSs,
3. Enter a profile with farm and farmer characteristics,
4. Select a recommendation algorithm to request a recommendation of suitable DATSs, and
5. Get insights into assessment information of DATSs that are being tested in testcases.

For example, a user could filter all DATSs when searching for "Greek arable farming DATSs for biodiversity preservation, in the form of computer software" and find a few corresponding available DATSs. Or, a user could have a Belgian Dairy farm, and find almost 30 recommended DATSs. To achieve this recommendation, the user must first supply the Tool with the appropriate data with information about

his/her farm to find the right match. The user can then select one of the recommended DATSs and gain insights about its information.
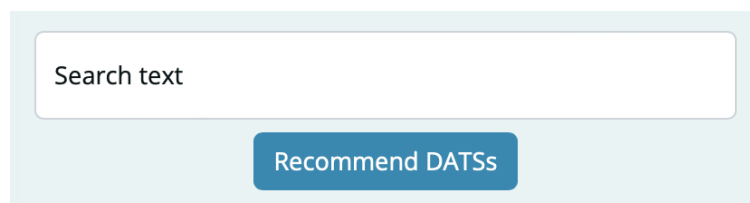
Description	Recommendation
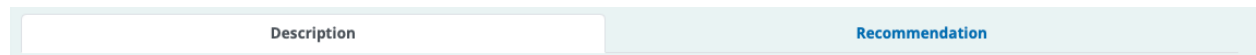
The description of the tool can be found under the "Description" tab in the top navigation bar. The tool currently requires no registration and/or logins. In the "Recommendation" tab, the tool can provide a recommendation given:

1. A natural language text in the "Search text" field,
2. The selected filters for DATS parameters in the left-hand column,
3. Entered farmer profile information in the top-part of the page, and/or
4. A selected recommendation algorithm also in the top part of the page.

Search functionality

A free text search field is available to search for a text string in the title, description or keywords of the available DATSs. A natural language text can be entered into the "Search text" field depicted that is situated above the "Recommend DATSs" button. When pushing this button, the tool will look for any DATS that has this text in its title, description or keywords.

Search text

Recommend DATSs

DATS parameter filtering

A recommendation for DATSs can be given based on filters for DATS parameters. The possible parameters to filter the DATSs are:

1. **Agricultural Sector**) the sector the DATS is targeting
2. **Functionality**) the relevant functionality of the DATS
3. **Benefits**) the benefits that can be reached by using the DATS
4. **Digital Form**) the digital form of the DATS
5. **Language** and **Country**) the supported language and targeted country of the DATS
6. **Cost Structure**) the cost structure of the DATS

The values for these parameters are the union of all possible values for the DATS available in the Recommendation Tool. When the "Recommend DATSs" button is pushed, only DATSs will be shown that have all the selected values as parameter values.

The DATS parameters filters can be selected on the left side of the tool.

Recommend DATSs

Clear filters

Agricultural sector

- ☐ Vegetables (73)
- ☐ Fruits and vines (53)
- ☐ Herbs (24)
- ☐ Plant production in general (86)
- ☐ Arable farming (93)
- ▼ View more

Functionality

- ☐ Plant protection management (156)
- ☐ Nutrition/Fertilisation management (155)
- ☐ Water management (127)
- ☐ Digital pest control (1)
- ☐ Rotary Parlor (1)
- ▼ View more

Benefits

- ☐ Optimization of resources use (282)
- ☐ Effective operational management (174)
- ☐ Efficient strategy planning (154)
- ☐ Enhanced adaptation & resilience to climate change (87)
- ☐ Environmental protection (183)
- ▼ View more

Digital form

- ☐ Mobile app (162)
- ☐ Weba pp (2)
- ☐ Stand-alone software (56)
- ☐ Web app (296)
- ☐ Webapp (2)
- ▼ View more

Language
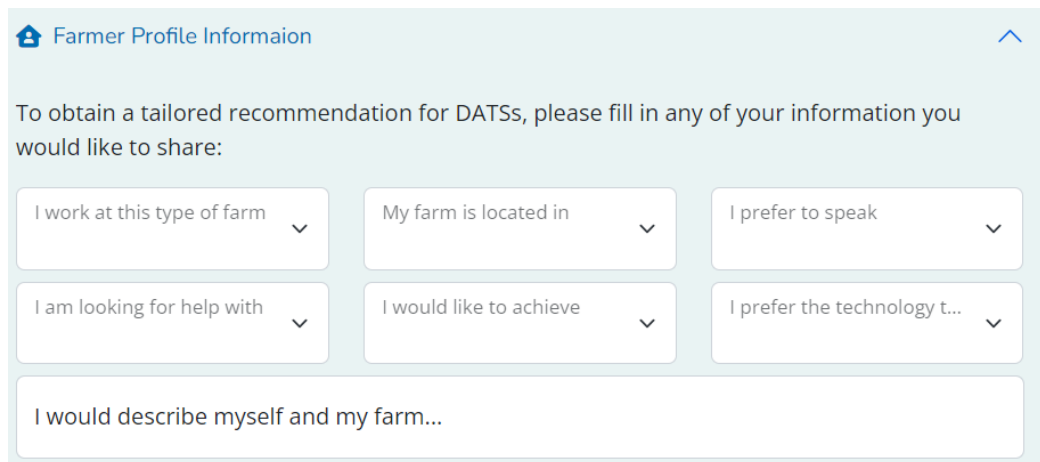
- ☐ French (72)
- ☐ Basque (15)

Farm profile characteristics

A recommendation for DATSs can be further be finetuned based on an extended Farmer Profile. The V2.0 release of the tool includes seven farm/farmer characteristics:

1. **farm type)** arable, dairy, fruit, egg, arboriculture, meat, flower, other
2. **farm location)** ISO-3166 country code
3. **preferred language)** supported languages
4. **desired functionality type)** subgrouping of functionalities
5. **desired achievement)** preferred list of benefits
6. **technological proficiency)** computer software, mobile app, spreadsheet, paper
7. **additional farm description)** open text provided by the user for additional farm description.
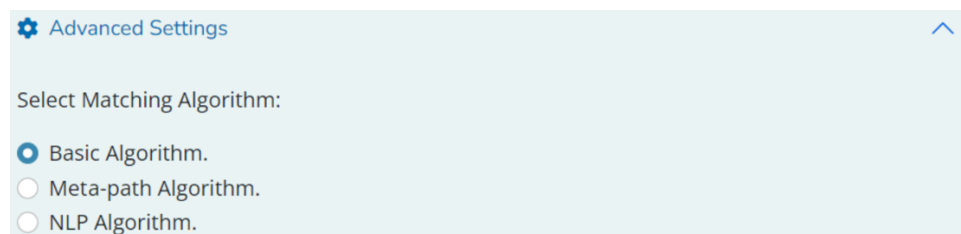
This farmer profile can be entered on the top of the "Recommendation" tab as depicted below. It allows the user to provide more information about themselves and their wishes and is supported by new and improved algorithms.

Recommendation algorithms

The V2.0 release of the recommendation tool provides the inclusion of various recommendation algorithms. These recommendation algorithms can be chosen by the user through an 'advanced settings' menu, as shown below.

The supported algorithms are:

- **Basic algorithm)** this algorithm only recommends DATS that have *exact matches* with the selected DATS parameter values and farm/farmer characteristics.
- **Meta-path algorithm)** this algorithm recommends DATS also based on *nearly exact matches* of parameters and characteristics and prioritizes DATS according to the number of matching parameters and characteristics.
- **Natural language processing algorithm)** this algorithm uses natural language encoding techniques to encode the available and requested DATS characteristics values and calculate a similarity score to find matching DATSs to be recommended.

By default, the basic algorithm is selected.

Requesting recommended DATSs

Once a search text has been entered, DATSs parameter filters are selected, farm characteristic values have been selected and/or a recommendation algorithm has been chosen, a recommendation for applicable DATSs can be requested by pushing the "Recommend DATSs" button. A columned list of recommended DATSs will be shown with a few parameters.

For instance, for the selection of Arable farm, Netherlands and Computer software as shown above, the following list of DATSs will be shown:

Detailed DATS information

When clicking on one of the DATSs a pop-up window will appear that shows a longer list of DATS parameters and their values, including keywords, digital form, languages supported, countries of usage, launch year and a link to a website for even further information or possibilities to download or purchase the DATS. See below for a screenshot of this pop-up window for one of the DATS.

For instance, the detailed information for the DATS BodemIdee contains the following information:

Testcase information

Finally, a recommendation also indicates for a DATS whether it has been or is being tested in a QuantiFarm testcase. This is indicated by a "**TESTED**" icon in the top right corner of the DATS overview page. See below for the DATS Farm manager which is apparently tested in one of the testcases.

In the pop-up window, the fact that this DATS is tested is indicated by a text saying in which testcases the DATS is used including a button per testcase to click on that brings the user to a webpage with more details about the results of the testcase. See the screenshot below.

When clicking on the testcase 9 icon, the user is guided towards the detailed testcase information of this testcase as shown in the screenshot below.