AGROSTRAT PROJECT – LIFE11 ENV/GR/000951

Cultivation Management Software

User Guide

CULTIVATION MANAGEMENT SOFTWARE

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LIFE11 ENV/GR/000951

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Introduction

The project LIFE11 ENV/GR/951 "Sustainable strategies for the improvement of seriously degraded agricultural areas: The example of Pistachia vera L" with acronym AgroStrat, is an ambitious project which foresees the development of an integrated scenario for the sustainable management of intensively cultivated Mediterranean areas using as example the cultivation of Pistachia vera L. trees, which are intensively cultivated in Aegina Island, Greece for the last 150 years.

One of the innovative project actions is the development of a soil monitoring software, which is expected to contribute to the sustainable management of intensively cultivated Mediterranean areas. The software consists of two parts:

- **Cultivation Management Software**
- **Central Management Monitoring Tool (for Local and Regional Authorities and agricultural associations)**

The first part, the Cultivation Management Software, is a software, which provides to farmers, specific consultancy on cultivated field management, as regards the quality of soil, irrigation water and waste or composts to be reused on soil. By entering data of soil analysis, of irrigation water and of waste or compost to use, the farmers obtain specific consultancy on fertilization, irrigation and reuse of waste or composts as well as on monitoring cultivated soil quality.

After the first data entry, the users may continue updating the system on most recent analyses and thereby to update it and receive new advices.

To assist users on monitoring soil quality, specific portable field equipment has been constructed, with which farmers can measure soil pH, electrical conductivity and moisture by themselves. These values can be also inserted into the software (information given on the project website http://www.agrostrat.gr, the Project-Field instruments) so as to ensure continuous monitoring of the cultivated areas.

It should be particularly noted that this advisory software does not intend to replace the role of agronomists to the provision of farming advices. Instead, the software is anticipated to assist the agronomists and simplify the way in which producers are informed regarding their cultivation and on the risk of soil degradation.

System Requirements

Supported Operation Systems

The Cultivation Management Software supports the 32-bit and 64-bit versions of the following operating systems**:**

- **Windows 7**
- **Windows 8, 8.1**
- **Windows 10**

Screen Resolution

Minimum screen resolution that is supported by the Cultivation Management Software is 1024x768. For optimal user experience screen resolution of 1920x1080 is recommended. If the Windows screen resolution settings are within the recommended range, but the software user interface does not appear properly, please advise section *Screen resolution troubleshooting*.

Installation

Installation File

Cultivation Management Software can be installed through an installation file found on the software section of the project's official web page: http://www.agrostrat.gr/?q=en/CultivationManagementSofware

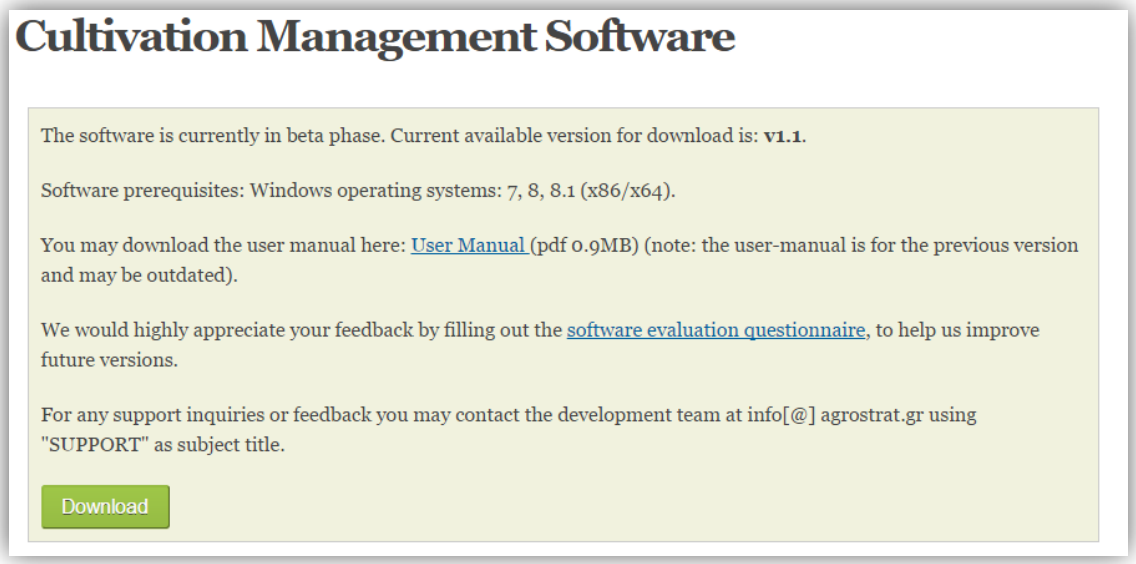


Figure 1. Download link of installation file

By clicking on installation link, an installation executable (Agrostrat_Setup.exe) is downloaded and stored to a predefined location (The stored location is depending on the settings of your web-browser).

Installation Wizard

Running the installation file (by double-clicking Agrostrat_Setup.exe) from the predefined store location, will initiate the installation wizard. While the installation process is similar in all different version of the supported Windows operating systems, specific screens of the installation wizard may defer slightly between the different versions. The installation process in Windows 8 operating system is stated below.

Installing Application on Windows 8

The first screen of installation wizard is shown in *Figure 2*.

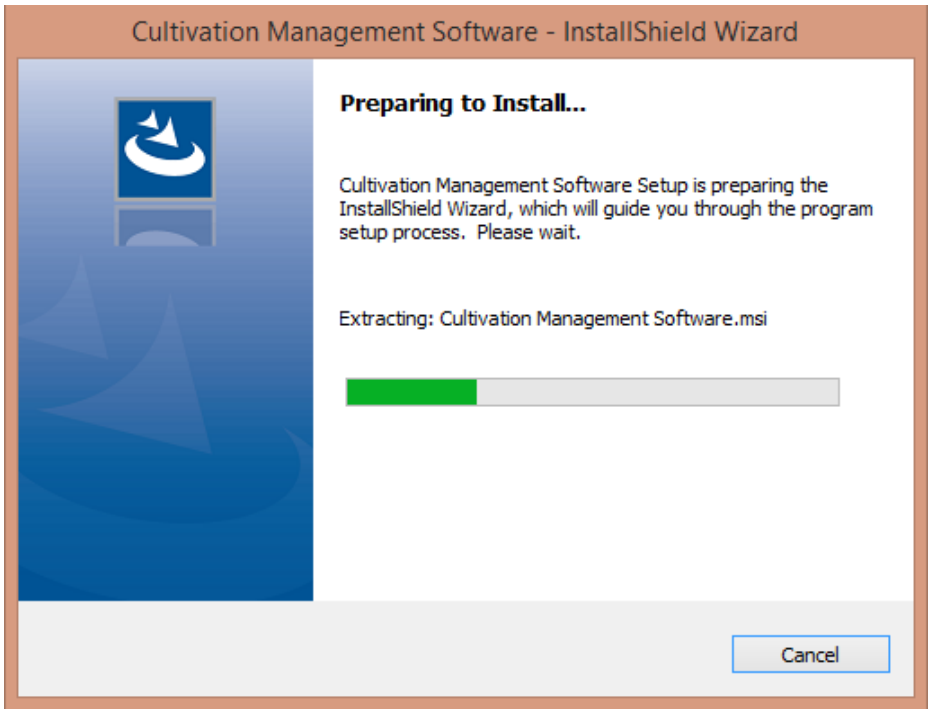


Figure 2. Initial screen of installation wizard

At the following two screens, shown in *Figure 3* and *Figure 4*, you must press "Next" button in order to proceed.

Figure 3. Press Next button in order to proceed with the installation

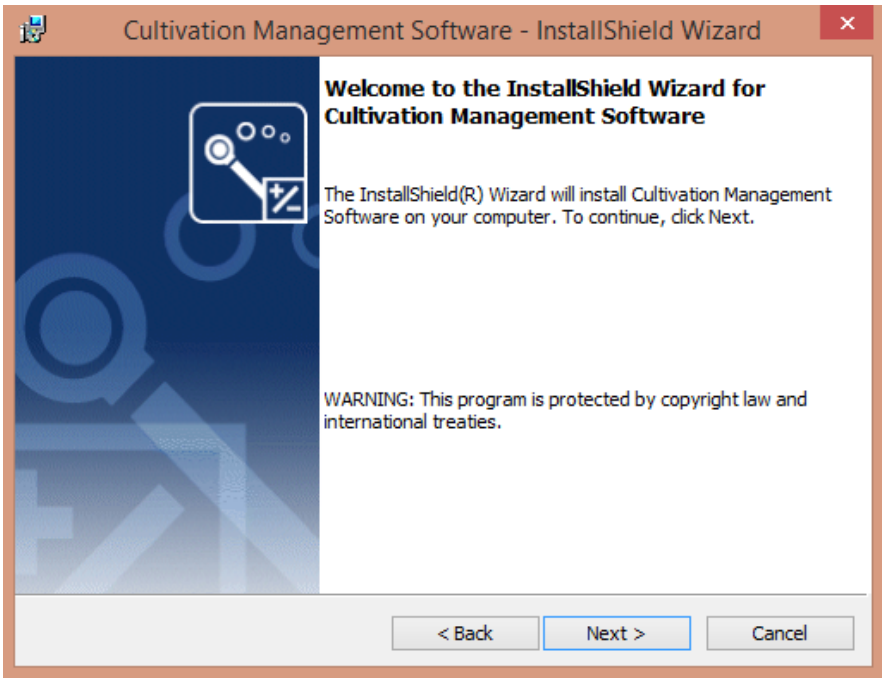


Figure 4. Press Next button in order to proceed with the installation

At the next screen as shown in *Figure 5*, you must press "Install" button in order to complete the installation process.

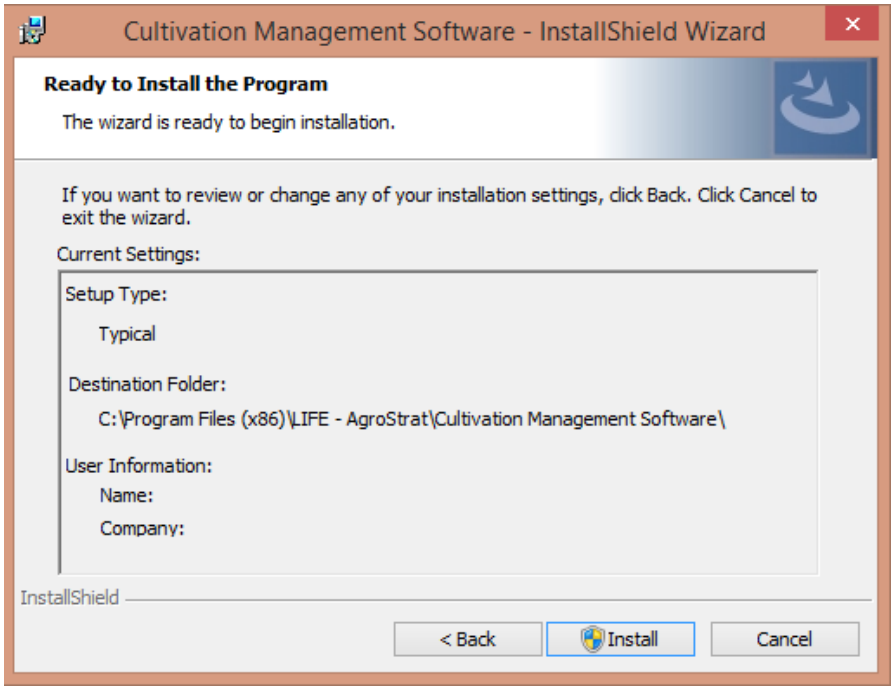


Figure 5. Press install to complete installation

On successful installation completion, press "Finish" button to close the installation wizard. Windows .NET4.5 (or newer) framework library is necessary to be installed, in order the software to be executed. If the specific framework does not exist already on your operating system, it will be installed automatically during the installation wizard. It may be essential to accept the license's agreement of the framework during that process.

Uninstall Application

To uninstall the application from Windows operating system, navigate to "Settings" and select "Add or remove programs". Select "Cultivation Management Software" from the programs' list in order to uninstall it.

Launching Application

Installation wizard will create a launch application icon in the startup menu but also on your Desktop. Desktop's launch icon will appear with the name "Cultivation Management Software".

Initial Screen

The first screen (*Figure 6*) displays the main six buttons of the application, related to the key features for managing the status of your cultivation. These are the following:

- **Field Data**

  Using this feature, user can define its filed information, as also the chemical analysis measurements of soil, water and organic material of each field.

- **Advisory**

  Through this feature, user receives rational lubrication instructions, according to the input data defined in "Field Data" operation and the practices he wants to apply.

- **Quick Rating**

  This allows the user to get a quick evaluation report of the soil, water and organic material status of its cultivation. The evaluation is based on the parameter values, that user has entered for each factor, using the data entry interface.

- **Waste Disposal**

  This feature allows user to receive advisory for safe solid or water waste disposal on soil.

- **Upload Data**

  Using this feature, user can field measurement values to the regional authorities, inform them about the status of its cultivation, in order to get personalized advisory.

- **Sensor Data**

  User receives an assessment report for the status of a selected field set, according to the field device measurements.

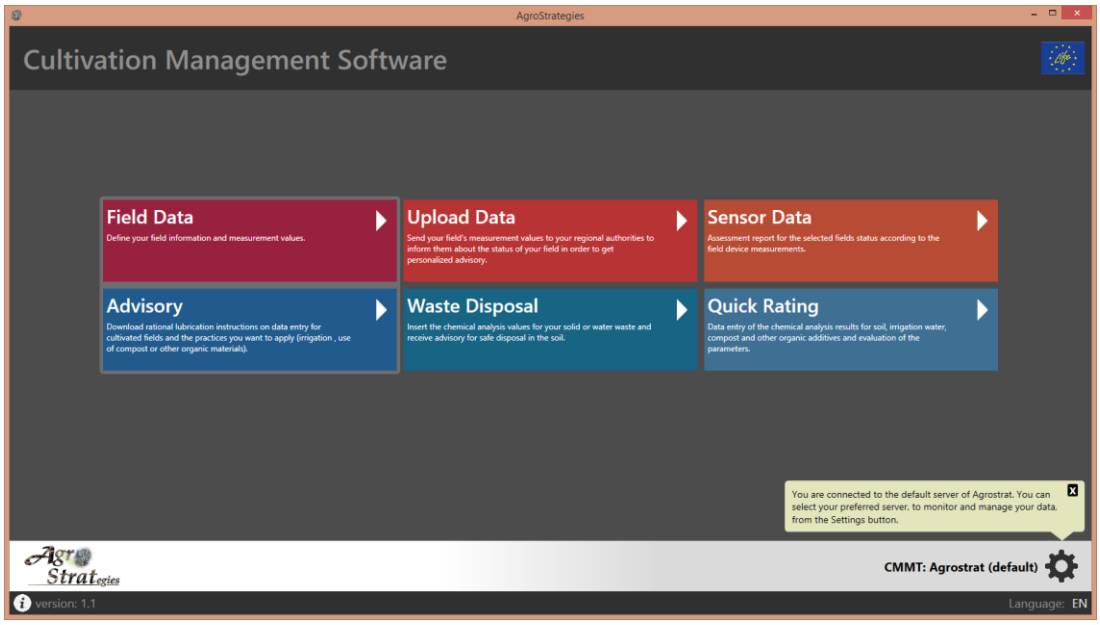
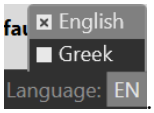


Figure 6. Initial screen view

In order to change the application language, you must select the Language: EN button from the status bar



The info button leads to the project information (*Figure 7*) where you can view the project description and the details for the contributors.

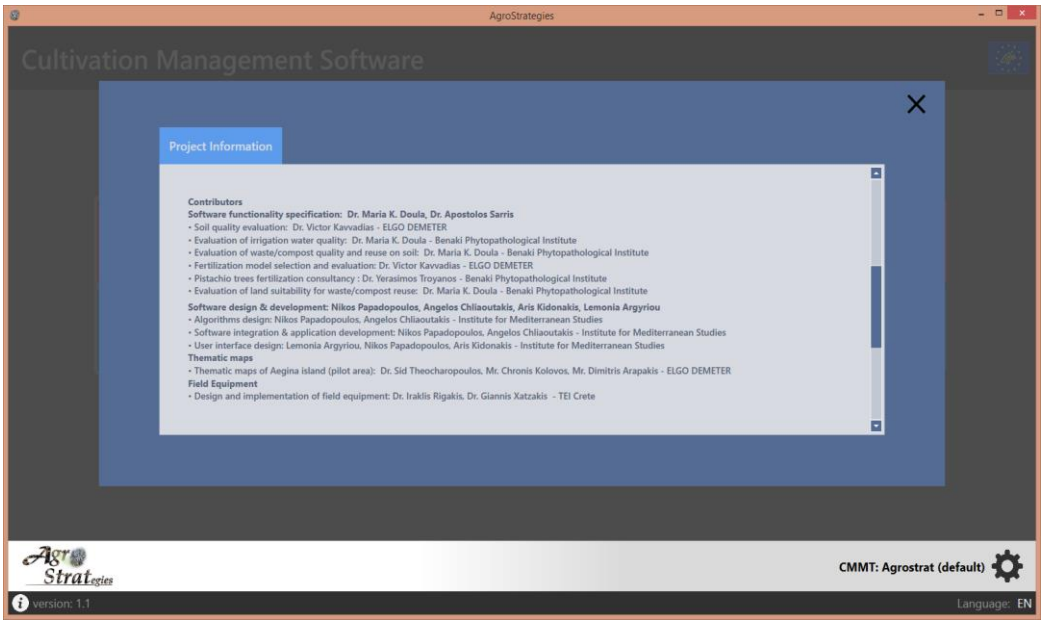


Figure 7. Project information view

Server Settings

The default server of the Agrostrat's project is selected to communicate with the application upon the initial execution of the application. Description information about the selected server **CMMT: Agrostrat Default Server** are shown at the bottom of the initial view. In addition, an informative popup text guide you to select the server of your regional authority, in order to achieve optimal management and monitoring of your measurement data, by selecting the "Settings" button. User can be informed about the detailed current server settings (*Figure 8*) if you press the "Settings" button.

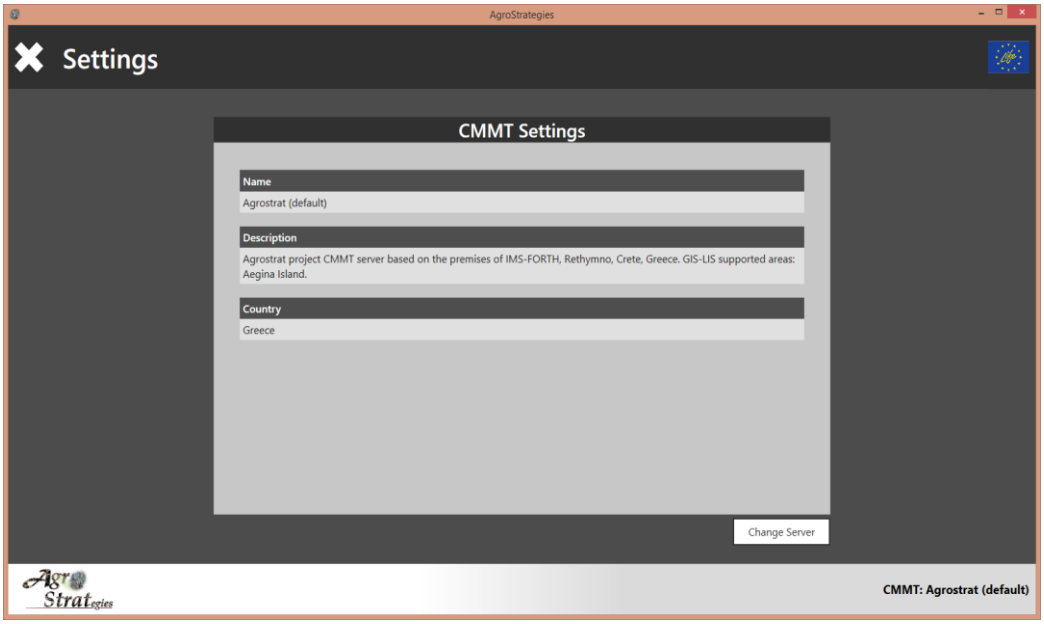


Figure 8. Current server settings

Press the Change Server button to change the current server setting. An active internet connection is essential for this feature. At the following screen shown in *Figure 9* a selection list with all available servers appears. Choose the server that contains data related to the region where your fields are located and press the Apply button.

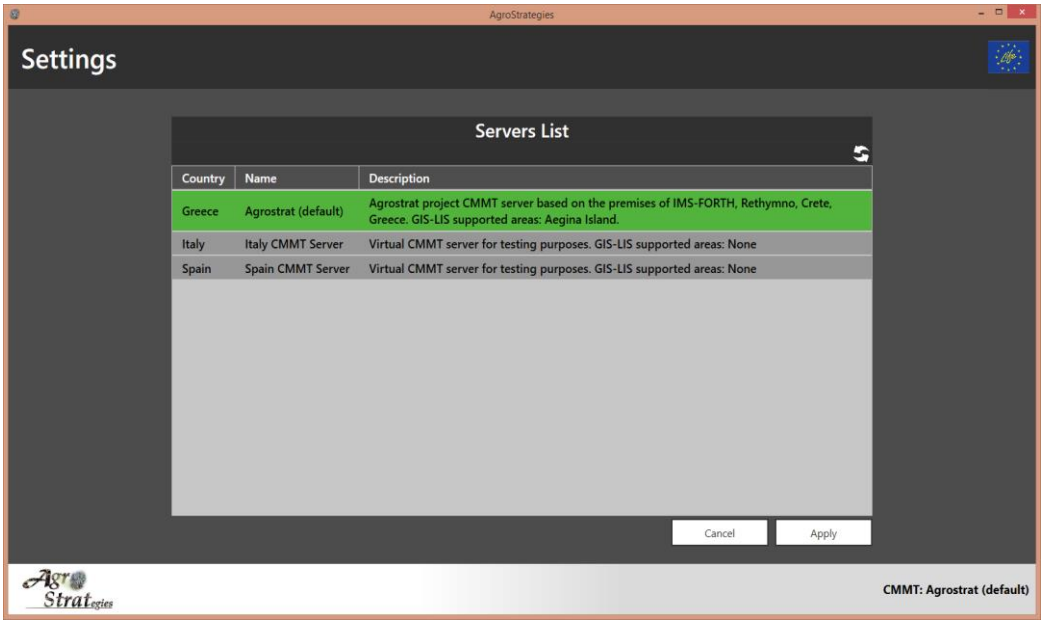


Figure 9. Available server list

If there is no server on the list related to your region, please contact the system administrator for more information. By selecting a new server, you will notice that the details in "CMMT Settings" view have been updated. Press the button in order to return to the initial view.

Main Features

Field Data

User can define/edit information about its fields, as also enter chemical analysis data for each field selected, using the features in the main view of "Field Data". The specific view is consisted by two separated select lists as shown in *Figure 10*. The cultivation fields defined by the user are displayed on the left selection list, while on the right selection list, the chemical analysis records appear upon selection of a certain field.

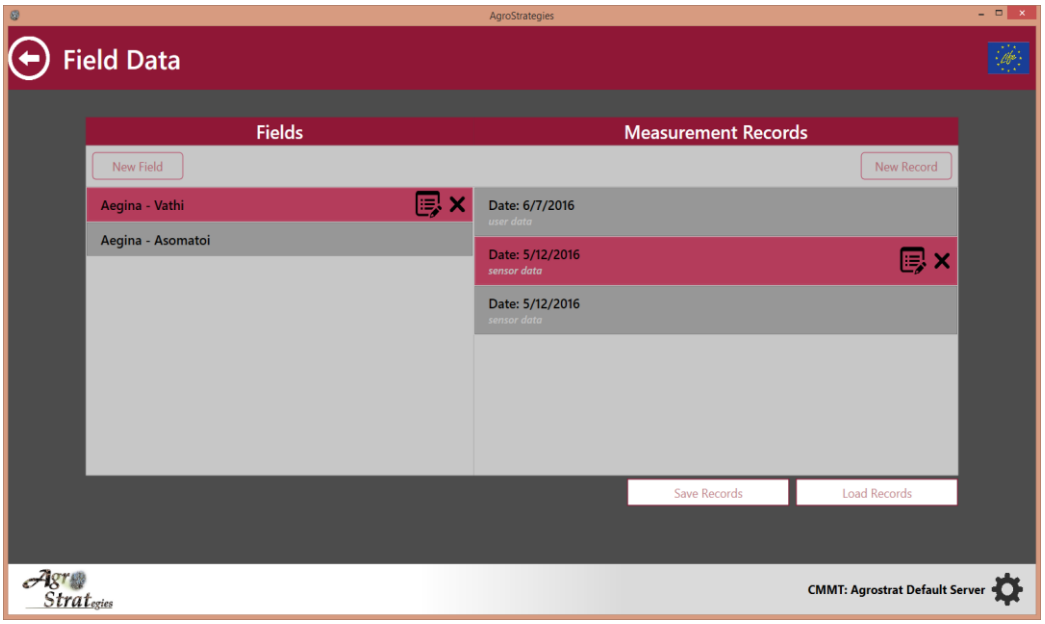


Figure 10. Field Data view

Add Field Information

Press the New Field button in order to define information about a new field. You must enter all the required information in the "Add Field Information" view (*Figure 11*) that is displayed next. You are able to define the name, an explanatory description, the area length and the country of the field. Furthermore, you can define the geographic location for your field selecting its coordinates using the map on the right side of the view, or entering them manually, using online map services (such as Bing or Google maps).

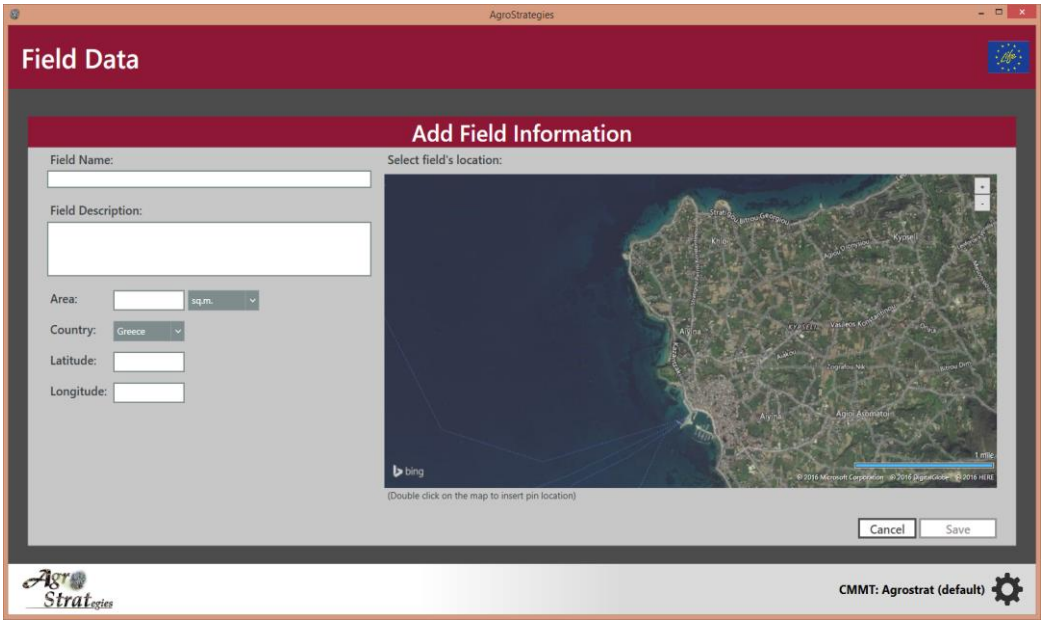


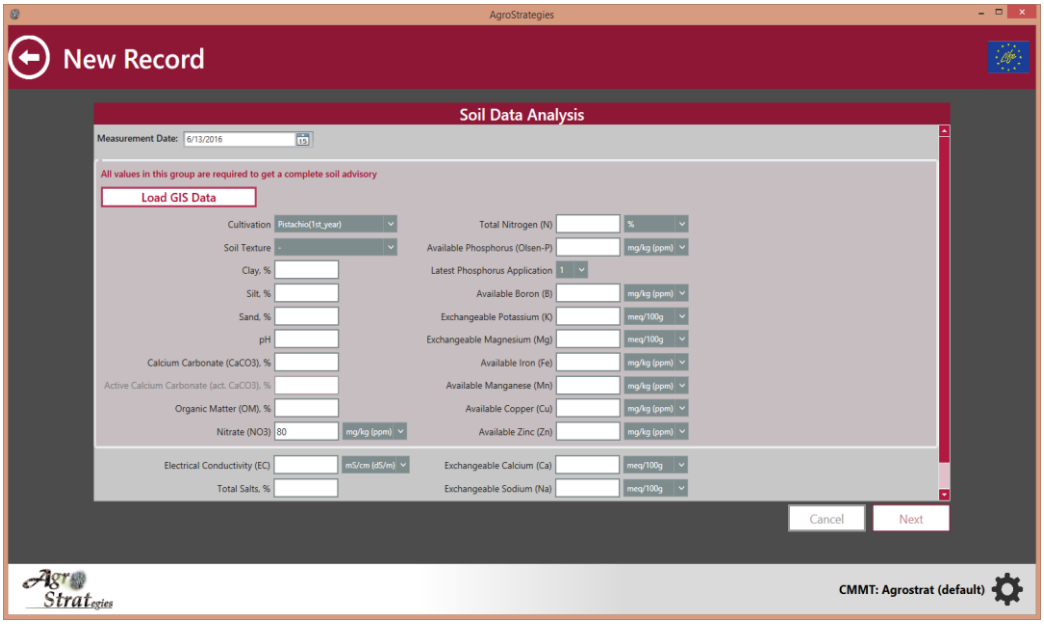
Figure 11. Add new Field Information view

To successfully navigate to the integrated map of the view, click the middle mouse button (or click the left and right button simultaneously) and drag to the desired direction. To zoom in/out use the scroll button of your mouse, otherwise use the plus/minus buttons + - found on the up right corner of the map. Finally, to define the coordinates of your field double click with your left button of your mouse on the desired location, inserting a pin on the map.

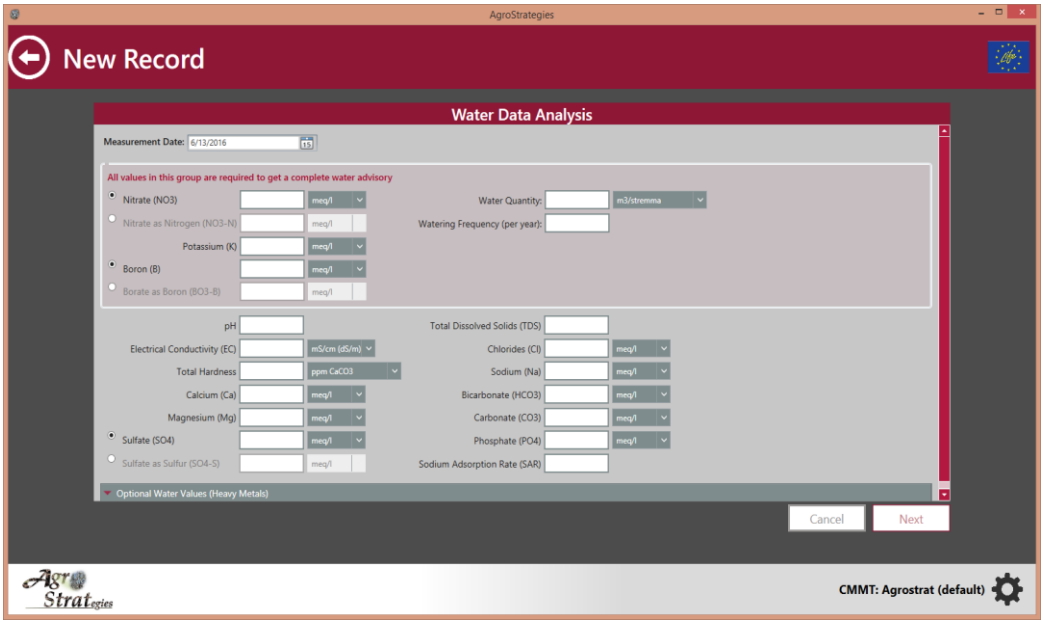
Press the Save button to store the information of your field. If you do not enter all the required information for your field, you will notice that the Save button is grey meaning it is disabled. Press the Cancel button to return to "Field Data" without storing the information for your field.

Add Chemical Analysis Data

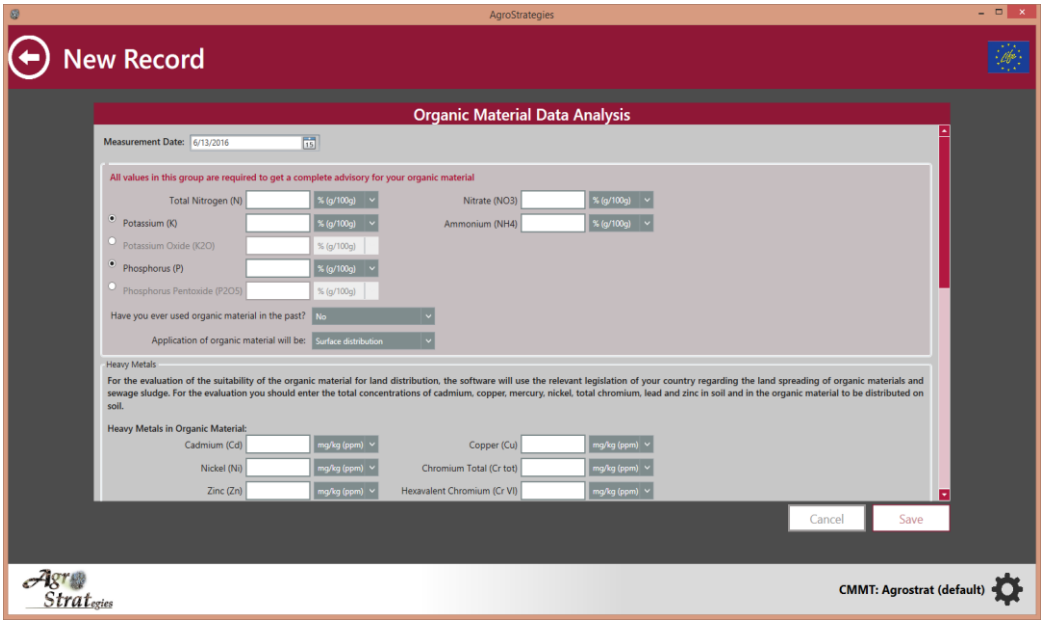
Select a field from the selection list and press the New Record button in order to enter chemical analysis data for that field. Enter chemical analysis data for the soil, water and organic material in the sequential views (*Figure 12*). In the first view enter the soil chemical analysis data and press the Next button to navigate to next screen. Do the same for the water chemical analysis view. At the third and last view enter the organic material chemical analysis data and press the Save button to store all the data and return to the "Field Data" view. Use the button to return to a previous screen during the input data process to change the values entered for a certain chemical analysis. Return to the "Field Data" view by pressing the Cancel button without storing any of the chemical analysis data entered.


AgroStrategies
New Record
Soil Data Analysis
Measurement Date: 6/13/2016
All values in this group are required to get a complete soil advisory
Load GIS Data
Cultivation
Pistachio(1st_year)
Soil Texture
Clay, %
Silt, %
Sand, %
pH
Calcium Carbonate (CaCO3), %
Active Calcium Carbonate (act. CaCO3), %
Organic Matter (OM), %
Nitrate (NO3)
80
mg/kg (ppm)
Electrical Conductivity (EC)
mS/cm (dS/m)
Total Salts, %
Total Nitrogen (N)
%
Available Phosphorus (Olsen-P)
mg/kg (ppm)
Latest Phosphorus Application
1
Available Boron (B)
Exchangeable Potassium (K)
meq/100g
Exchangeable Magnesium (Mg)
Available Iron (Fe)
Available Manganese (Mn)
Available Copper (Cu)
Available Zinc (Zn)
Exchangeable Calcium (Ca)
Exchangeable Sodium (Na)
Cancel
Next
CMMT: Agrostrat (default)

(a)

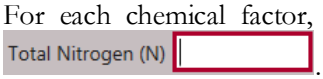

AgroStrategies
New Record
Water Data Analysis
Measurement Date: 6/13/2016
All values in this group are required to get a complete water advisory
Nitrate (NO3)
meq/l
Nitrate as Nitrogen (NO3-N)
Potassium (K)
Boron (B)
Borate as Boron (BO3-B)
Water Quantity:
m3/stremma
Watering Frequency (per year):
pH
Electrical Conductivity (EC)
mS/cm (dS/m)
Total Hardness
ppm CaCO3
Calcium (Ca)
Magnesium (Mg)
Sulfate (SO4)
Sulfate as Sulfur (SO4-S)
Total Dissolved Solids (TDS)
Chlorides (Cl)
Sodium (Na)
Bicarbonate (HCO3)
Carbonate (CO3)
Phosphate (PO4)
Sodium Adsorption Rate (SAR)
Optional Water Values (Heavy Metals)
Cancel
Next
CMMT: Agrostrat (default)

(b)



(c)

Figure 12. Chemical analysis input views (a) Input soil chemical analysis, (b) Input water chemical analysis, (c) Input organic material chemical analysis

For each chemical factor, enter the chemical analysis value at the box beside the name of the factor 

. Choose the necessary measurement unit for each factor using the dropdown menu 

, when applicable, according to the chemical analysis report you have. In such cases where the chemical analysis factors can be found in different forms, choose the right one using the radio buttons found on the left of the factors' name. Proceed by entering the value of the factor to the enabled textbox beside

.

Fill all the required factors' values found on the colored filled box, as shown in the figure below, in order to receive complete fertilization advisory.

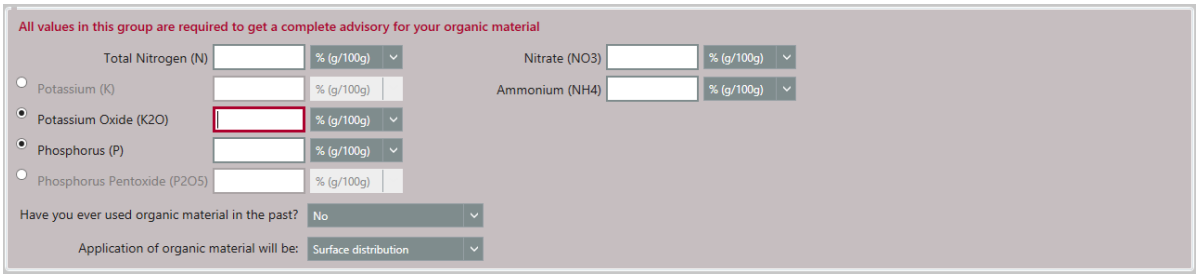


Figure 13. Required organic material chemical analysis values, to receive complete fertilization advisory

Press the Load GIS Data button, found on the input soil chemical view, in order to get the factor values you are missing for chemical analysis of the laboratory. The feature uses the GIS-LIS service to retrieve the missing values. For more information about the GIS-LIS service, visit the project's official website.

Edit/Delete Data

Edit/Delete the information defined for a stored field, as also its chemical analysis records, using the "Edit" and "Delete" buttons accordingly. These buttons appears, upon selecting a certain filed (*Figure 14*) or a chemical analysis record, using the fields and measurements select lists.

Figure 14. Select field record to display the edit and delete buttons

"Edit Field Information" and "Edit Record" views, which are displayed if you press the edit button, are similar to the views "Add new field information" and "New Record" views descripted in sections *Add Field Information* and *Add Chemical Analysis Data* accordingly. In this case, each view is already filled with the previously stored data. If you choose to delete a field or measurement record, an overlay confirmation message is displayed.

Save/Load Records

Use the Save Records button to save all of your fields' information including the chemical analysis records of each field, to a specific location of your choice. Define the name of the file containing the stored data as also the location to be stored, using the popup menu that is displayed. In contradiction press the Load Records button to load data to the application, that are previously stored using the method described above. Use the overlaid popup menu to load the file containing the stored data. All the data already stored using the "Field Data" featured will be lost by executing that action, and will be replaced by the one found on the file.

Advisory

This feature offers user the capability to receive an evaluation report of the chemical analysis values entered for a selected field. User can also receive detailed fertilization instructions, according to practices he wants to apply, taking into account the legislation regulations of his country.

The initial screen displayed if you select the "Advisory" (*Figure 15*) contains two select lists similar to the "Field Data". Select a field and a contained measurement record, previously stored in the "Field Data" view, using the select list in order to receive advisory for the specific record selected.

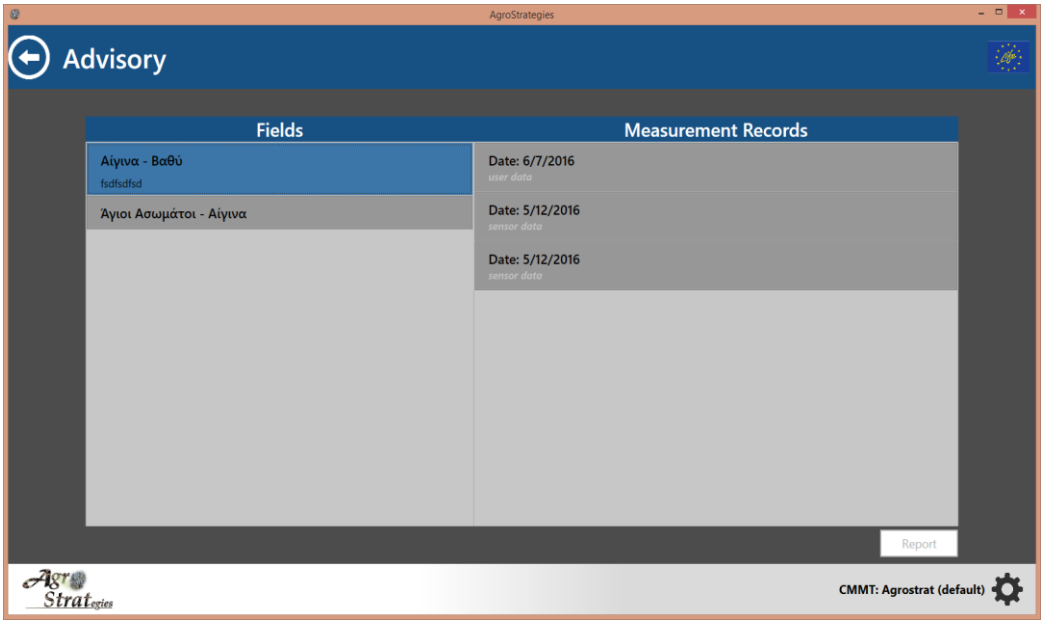


Figure 15. Choose a field and a measurement record for that field to receive evaluation and advisory

Evaluation Report

Press the Report button to preview the "Evaluation Report" view as shown in *Figure 16*. The view contains an array with records about the evaluation of the chemical analysis values, you selected. Each evaluation record is consisted by the name of the chemical factor, the value you entered, the category of the factor, and the evaluation. The evaluation is divided to a detailed evaluation description text and a color scale indicator. Red color indicates a strong concern, orange is of medium concern, yellow is of light concern and green is an optimum value indicator.

Figure 16. Evaluation report view

Use tab on the left side of the view, in order to navigate between soil, water and organic material evaluation reports.

Advisory Report

Navigate to the "Advisory Report" (*Figure 17*) view by pressing the Next button, to receive rational fertilization advisory, in order to use conventional fertilizers or any organic material, according to the values stored to the specific record selected. Through "Advisory Report" view, you receive information about the exact lubrication quantity for each primary chemical element, as also detailed instructions for their disposal.

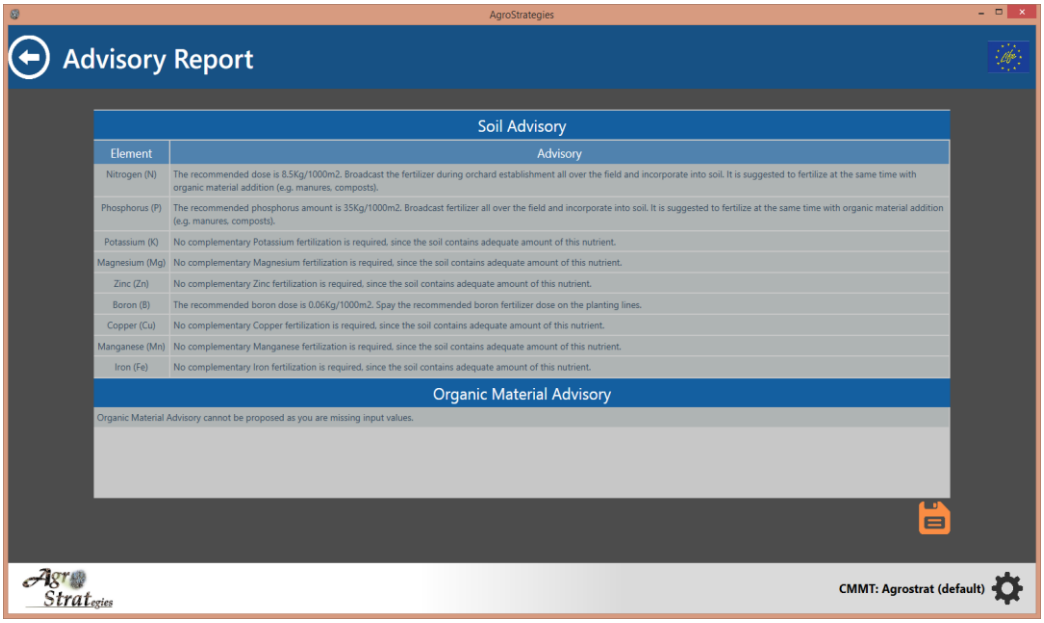


Figure 17. Advisory report view

Press the button to export the Evaluation and Advisory report and store them locally as a pdf file.

Quick Rating

Using this feature user can receive a quick evaluation, regarding soil, water and organic material status, based on the chemical analysis entered.

In the first view of the "Quick Rating" (*Figure 18*) feature, you may enter the values of the parameters that concerns the soil factor.

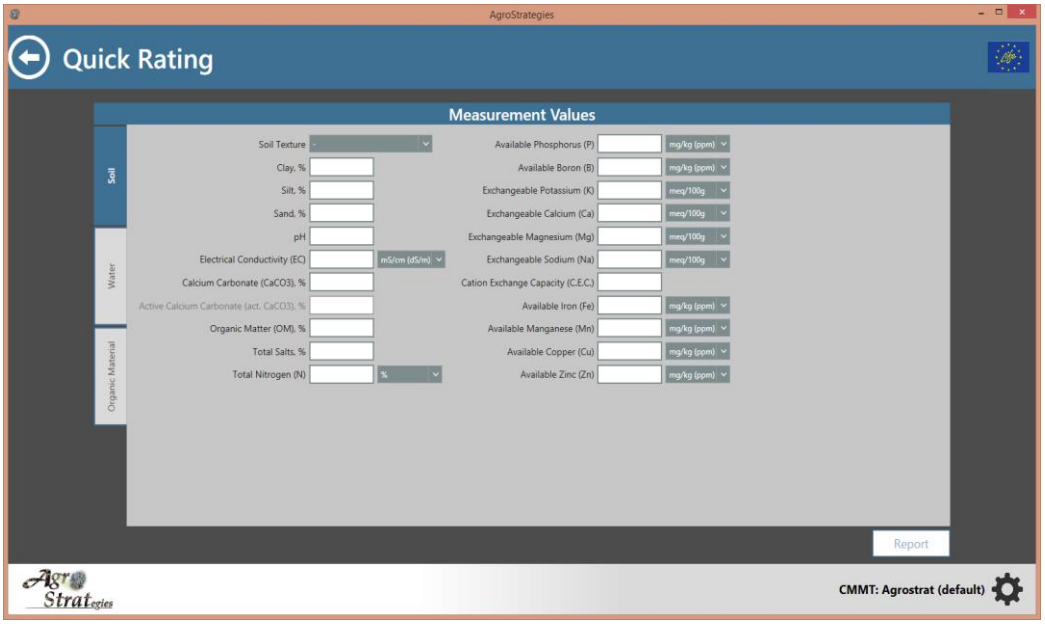
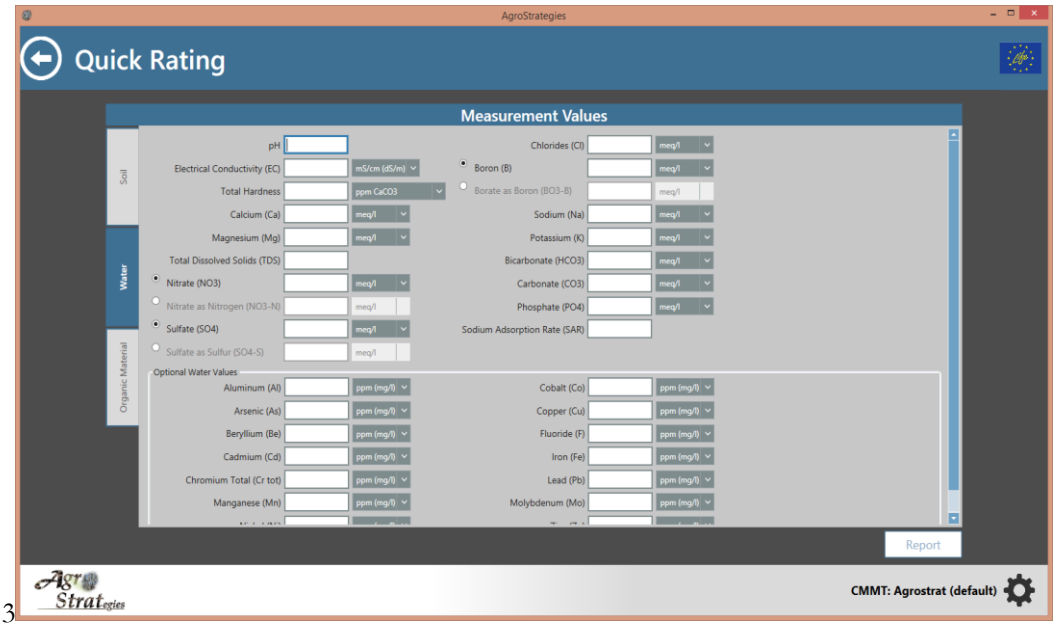


Figure 18. Input chemical analysis values for soil

By selecting the "Water" tab you navigate to the screen for entering data for the water (*Figure 19*).



3

Figure 19. Input chemical analysis values for water

Finally, you may select the "Organic Material" tab in case you want also to evaluate the status of organic material you may own by entering the values for its relative parameters (*Figure 20*).

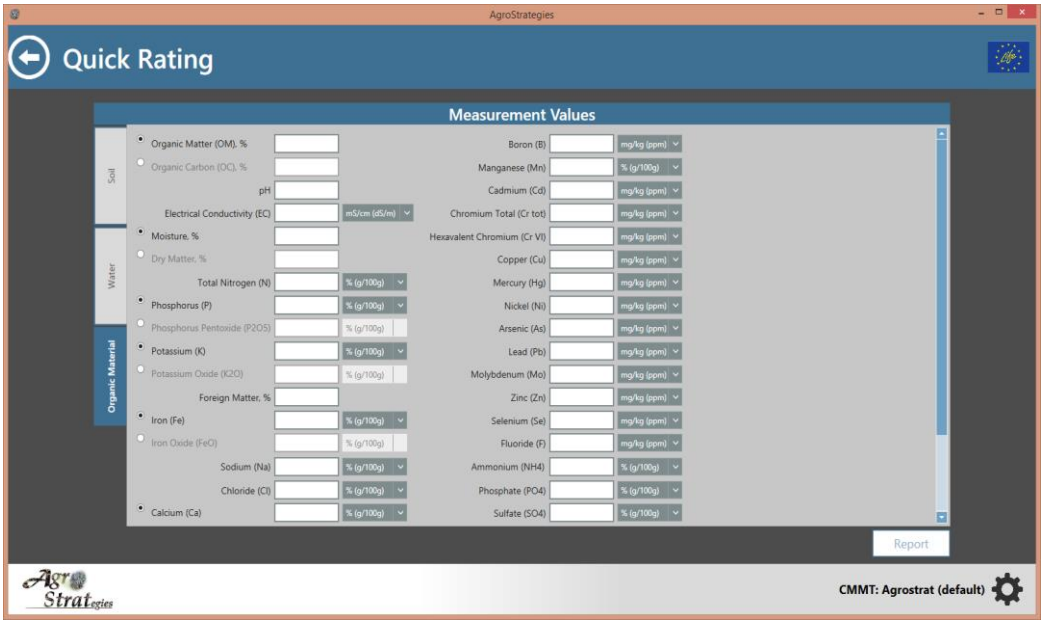
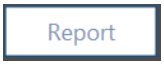


Figure 20. Input chemical analysis values for organic material

After finalizing the data entry session, you may view your evaluation report by selecting the 

button below. The screen that appears is described in section *Evaluation Report*.

Waste Disposal

Using the "Waste Disposal" user can input chemical analysis data of the waste he wants to dispose, as also chemical analysis data of the soil, where waste will be disposed. You have to select a specific stored field for the solid or water waste to be disposed, using the initial view of this feature (*Figure 21*).

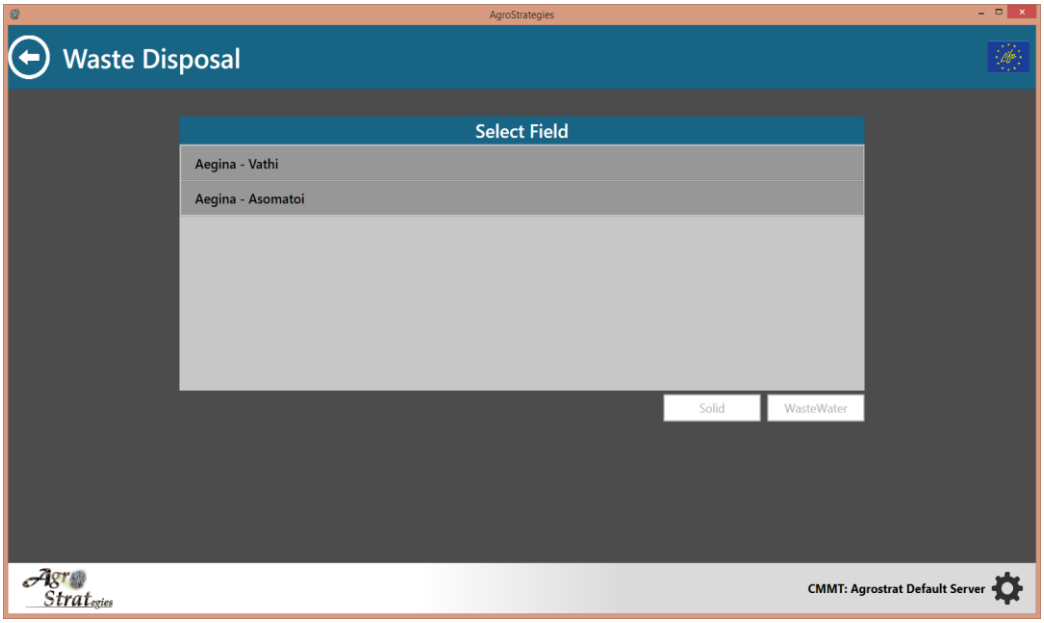


Figure 21. Choose a stored field on the initial view of Waste Disposal

You will receive information about the suitability of solid or water waste disposal, according to the field selection from the list. Suitability information returned by the software depends on morphological parameters of the field's geographical location. For the "Waste Disposal" feature, active internet connection is necessary. Select one of the buttons, found below the field list, according to the type of waste you need to dispose (solid or water). Buttons are both enabled (*Figure 22*), only in case where soil is suitable for both solid/water waste disposals.

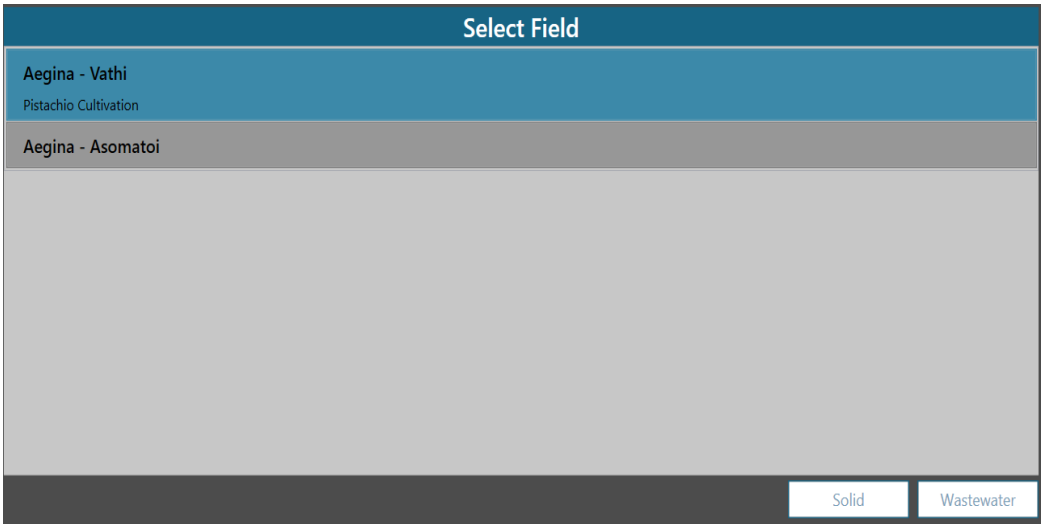


Figure 22. Selected field is suitable for both solid and water waste disposals

On the other hand, if either type of waste disposal in not applicable on field's soil, the corresponding button is disabled. In such case an informative text, indicates also the type of waste that is unsuitable for disposal. (*Figure 23*).

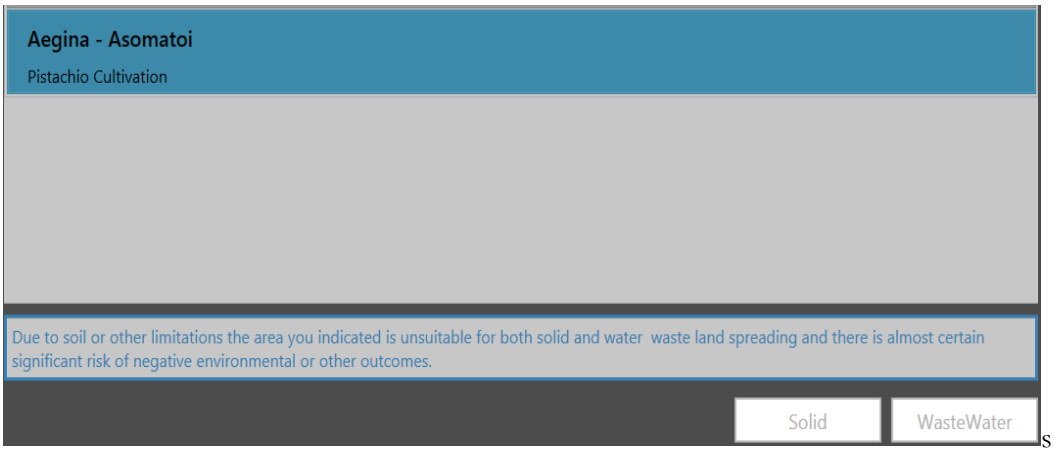


Figure 23. Field soil is unsuitable for waste and water waste disposal

Solid/Water Waste Disposal

In case field's soil is suitable for waste disposal select Solid or WasteWater button, to navigate to solid or water waste disposal view respectively. At the next view (*Figure 24*) you need to enter the required chemical analysis values of solid or water waste (depends on the selected action) to be disposed, but also the soil's chemical analysis.

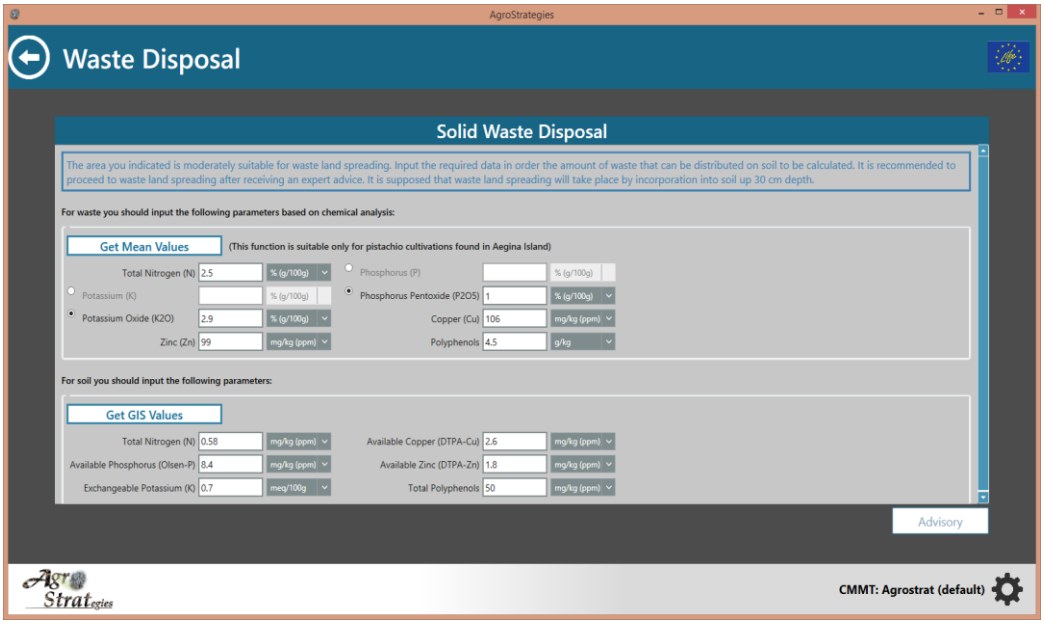


Figure 24. Solid waste disposal view

Enter all the required data and the press the Advisory button to receive information about the maximum amount of solid or water waste that can be disposed throughout the entire area of the field (*Figure 25*). Button will remain inactive if required data are missing.

You have also the capability to get missing soil chemical analysis values, using the GIS-LIS service as described in section *Add Chemical Analysis Data*. In addition, you can retrieve missing values of waste chemical analysis using "Retrieve Mean Values" but at the current version of the software, function is only suitable for the field of Aegina Island.

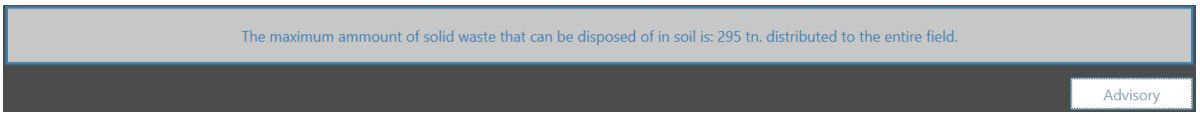


Figure 25. Solid waste disposal report about the maximum amount to be disposed, according to the data entered

Upload Data

User can upload the information of each stored field, as also the chemical analysis records, to regional authorities by using the "Upload Data" feature. Data are uploaded to the responsible authority's server chosen by the user as described in section *Server Settings*. Authorities can provide the user with a personalized advisory, based on the data uploaded.

In the main view of the "Upload Data" feature (*Figure 26*) choose the field to be upload, along with its descriptive information and its chemical analysis records. Only fields that contains geographical coordinates and at least one chemical analysis record are displayed in the selection list. Press the Send button to upload data to the responsible authority. To successfully upload data using the specific feature, an active internet connection is required.

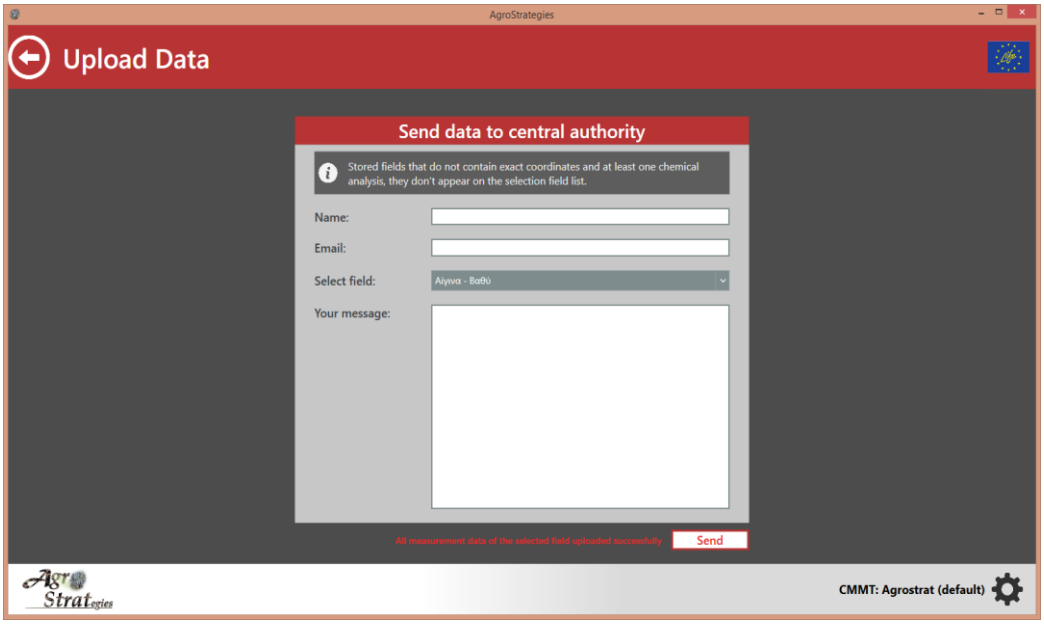


Figure 26. Upload data view

In addition, along with the field data uploaded, you can send your name, your email and a relative question. Filling out the later information is optional, but it is highly recommended in order the responsible authority can conduct with you in order to provide personalized advisory.

Sensor Data

This feature (*Figure 27*) is responsible for storing measurement data, collected using the field equipment. It is consisted by three logical operational steps:

- **Reading the measurement data, stored on the memory data file of the field equipment.**
- **Pairing the measurement data read with the fields already stored on the software.**
- **Storing each measurement data record to its paired field.**

Steps are described in detail in the following subsections.

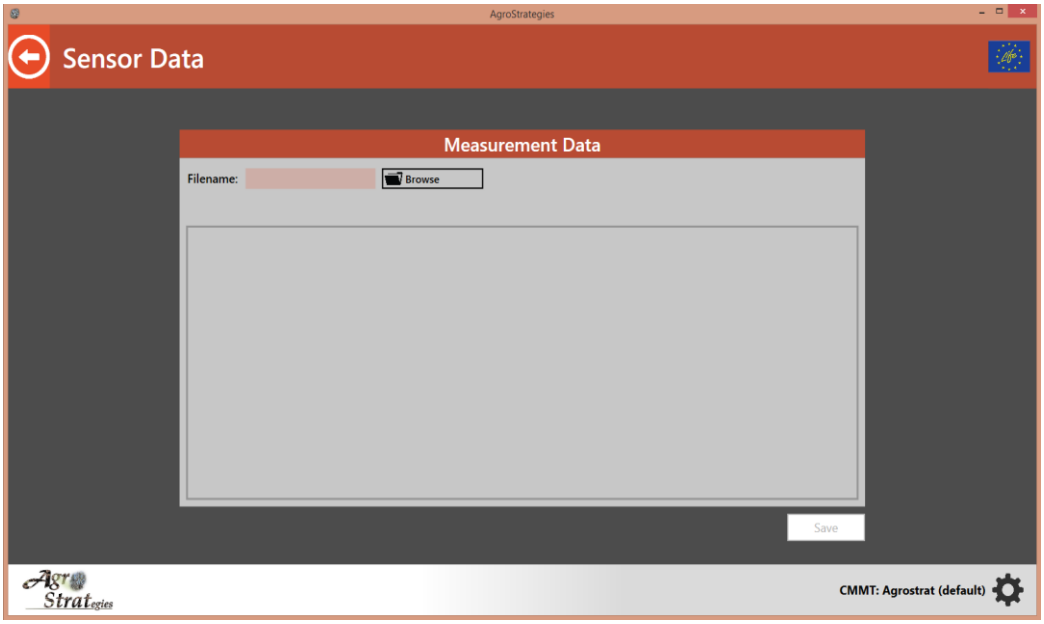


Figure 27. Sensor Data view

Reading Field Equipment's Data

In the main view of "Sensor Data" feature, press the "Browse" button to navigate to the disk location where the field equipment's file is stored. To get more information and detailed instructions on how to use the field equipment, and how to store the measurement data file to your local disk, please refer to user manual found on the project's official website (http://agrostrat.gr/en/fieldEquipment).

Software will load all the stored measurement values, by selecting the file from the relative location, as shown in *Figure 28*. A descriptive error message is displayed if the Software is unable to read the file.

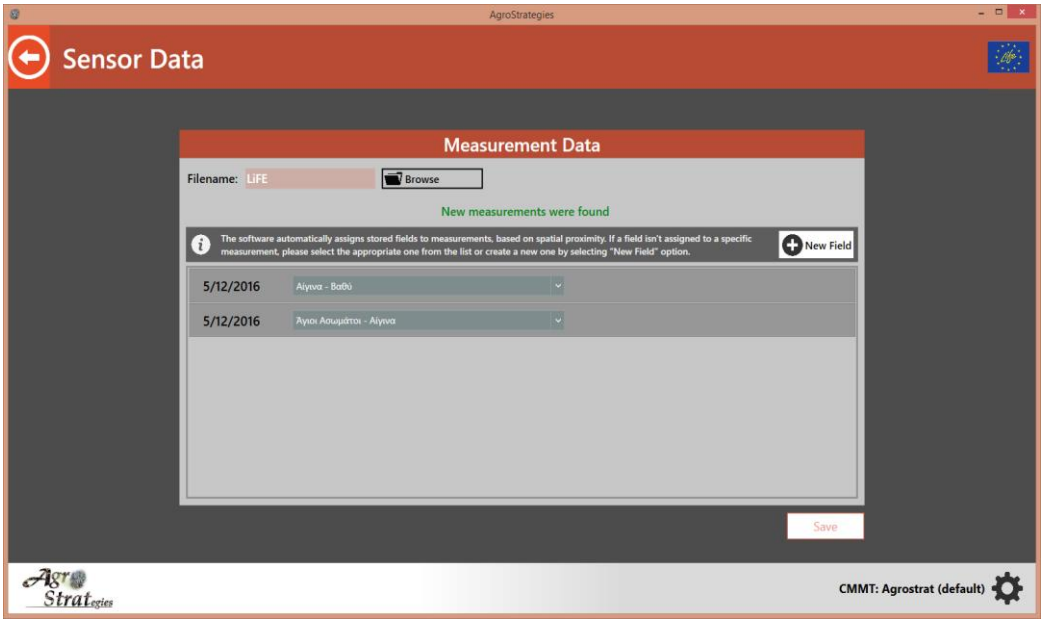


Figure 28. Measurement data stored on the memory file of the field equipment, are successfully loaded

Pairing data

In case where the measurement data file contains new measurements, successfully loaded during the previous step, software will automatically try to pair them with already stored fields, based on the geographical coordinates of each field. *Figure 29* displays the selection list with the new measurements found. Each record on the list contains the measurement date on the left, and the paired field on the right.

Figure 29. Pairing measurement data – store fields selection list

If a measurement data record cannot be paired with a stored field automatically, the active selection, in the field dropdown list displayed beside the measurement date, will be empty as shown in *Figure 30*. In that case, you must pair the measurement data record with a stored field manually, using that dropdown list.

Figure 30. Software was unable to pair the measurement data with a stored field

If you cannot find the appropriate field on the dropdown list, (you have not stored that specific field yet, through "Field Data" feature), press the "New Field" button to insert it to the system. (see section *Add Field Information*). Field will be displayed on the dropdown list as soon as you complete entering all the required information and store it to the software.

Data Storage

Press the 

button to store the measurement data to the paired field as explained in the previous section. If a specific measurement record is not paired with a field, it will not be stored to the system. Each measurement data record successfully stored to the system will be displayed in "Field Data" feature by selecting the corresponding field, with the identifier "equipment data" as shown in *Figure 31*.

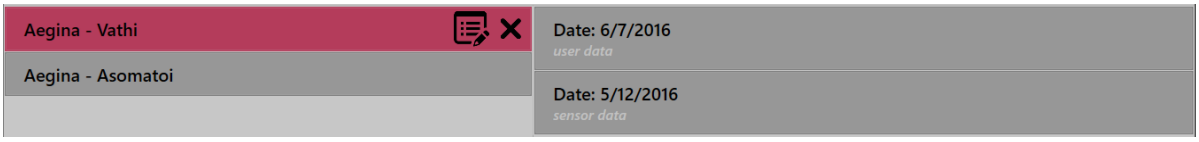


Figure 31. Field equipment's data displayed to "Field Data" view after successfully stored to the system

Troubleshooting

Storing installation file troubleshooting

Specific web browsers may block the installation file from being stored, indicating the file may be harmful for your computer. In order to bypass this action, you must explicitly inform the web browser that the installation

file is safe. As an example, *Figure 32* shows how to inform Google Chrome browser that the setup.exe file is not harmful for your computer by pressing the "Keep" when the relative warning message appears.

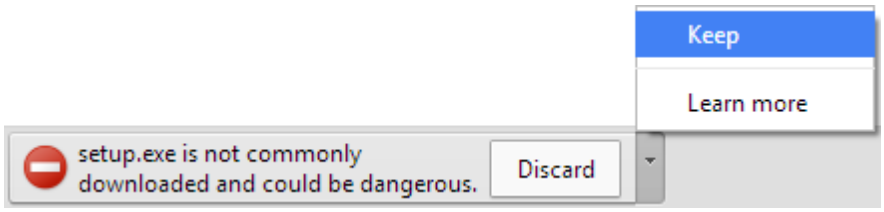


Figure 32. Google Chrome warning message after software download from the web

Installation Troubleshooting

In most cases, in Windows 8, 8.1, the initial screen of setup wizard won't appear immediately but instead the following message will appear (*Figure 33*), indicating a warning for protecting your pc from running an application coming from an unknown source. This is common security Windows message of no concern for this installation.

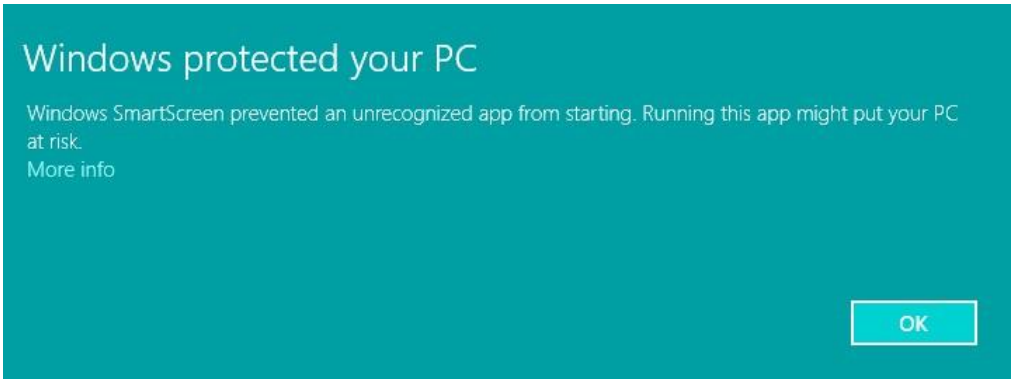


Figure 33. Windows SmartScreen preventing the application to be installed immediately

Proceed with the installation process, by clicking the "More Info" button. At the next screen, select the option "Run anyway" as shown in *Figure 34*.

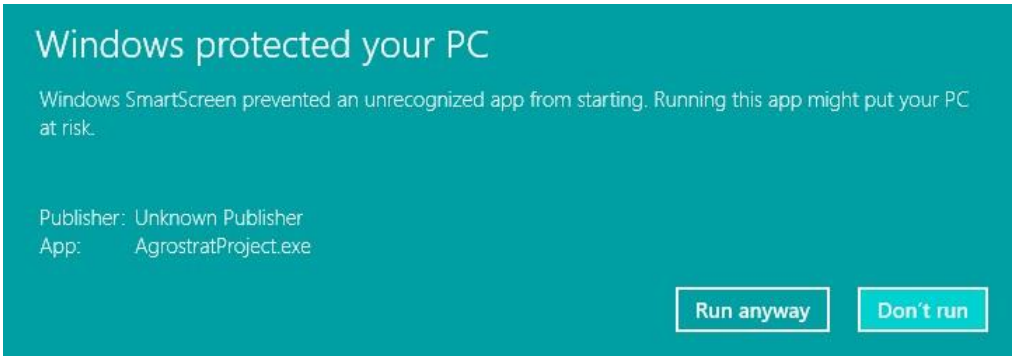


Figure 34. Press "Run anyway" button in order to proceed with the installation

Screen resolution troubleshooting

Setting your screen resolution to the recommended dimensions, may still cause problems to the display of the software views (some views missing some part of the screen). In such cases, the most probable cause is the current settings of the size of the text and icons in Windows.

To change the size, right click on your Desktop and choose "Screen Resolution" from the menu that appears. At the next screen, choose "Change the size of text and other items" (*Figure 35*).

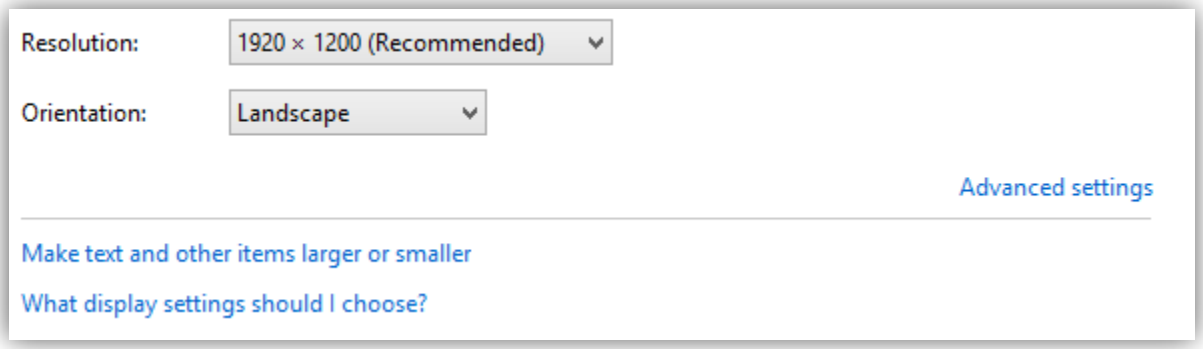


Figure 35. Select to change the size of text and other items

Make sure that in the next screen that is displayed the "Small Size – 100% (Recommended)" is selected (

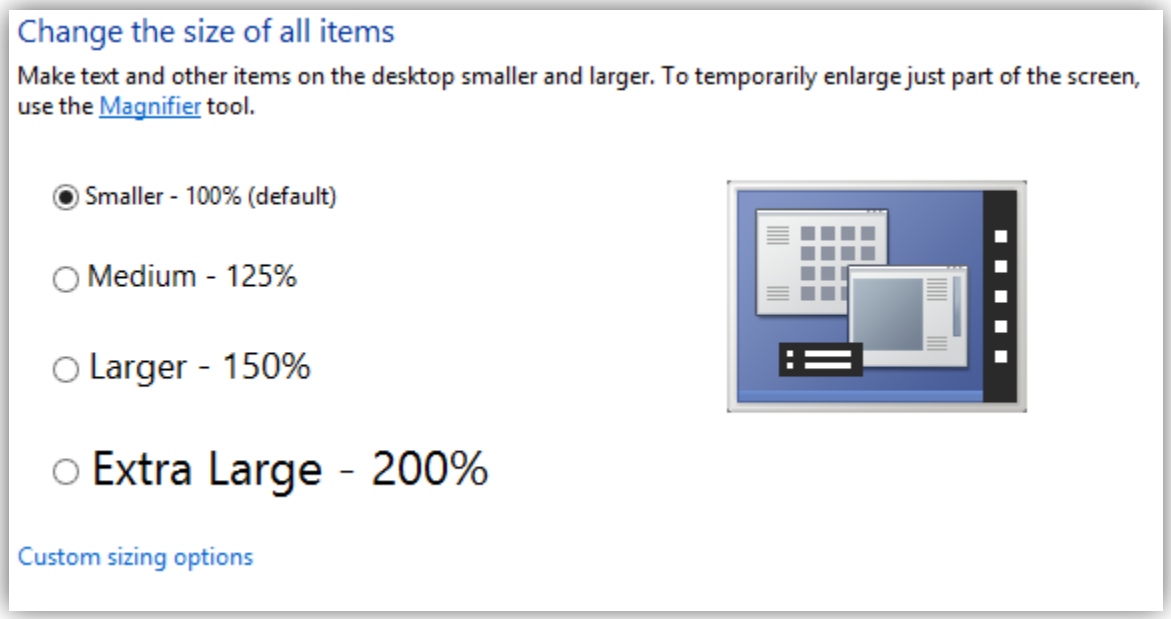


Figure 36). If not the case, then select it, click "Apply" button and restart the software.

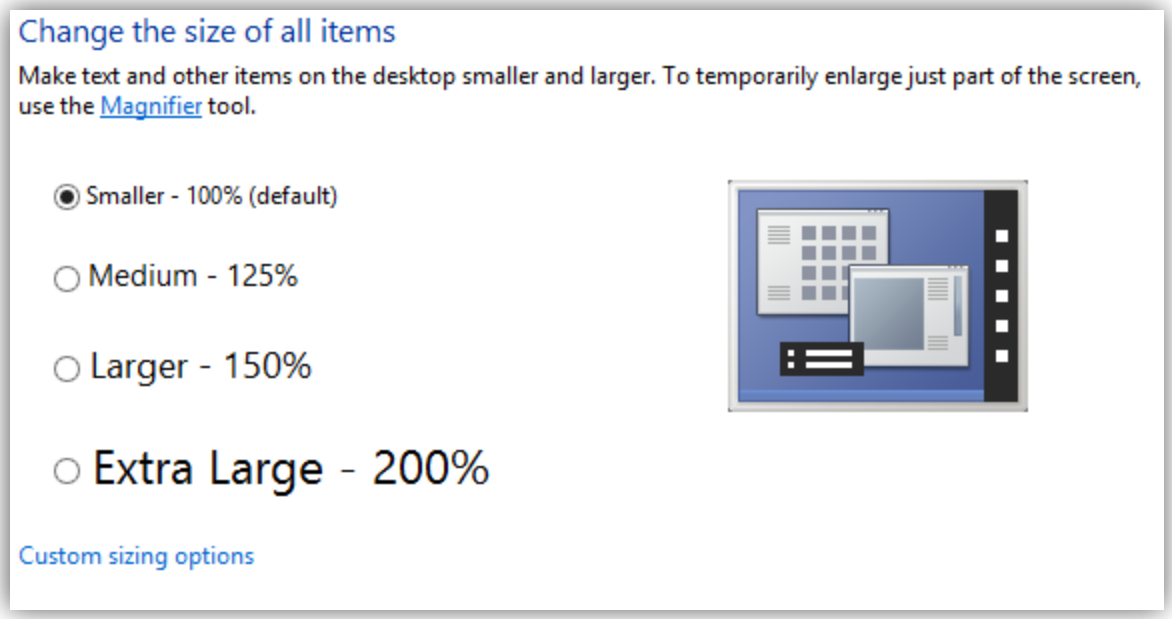


Figure 36. Select the small size of text and other items

If this does not solve the problem of the screen's resolution, please contact the system administrator.