AI4SoilHealth

Modules for report generation

D4.10

Version 1.0
23 December 2025

Lead Author: Vedran Mornar, FER and Andrej Slapničar, FER

Contributors: Maulana Ikram Wibisana, OGH and Giulio Genova, OGH

Reviewed by: Tomislav Hengl, OGH, Josip Križan, MultiOne and Luka Antonić, MultiOne

Action Number: [101086179]

Action Acronym: [AI4SoilHealth]
Action title: [Accelerating collection and use of soil health information using AI technology to support the Soil Deal for Europe and the EU Soil Observatory]

HISTORY OF CHANGES		
Version	**Publication date**	**Changes**
1.0	23.12.2025	▪ Initial version

Executive Summary

This document describes a set of modules integrated into the AI4SoilHealth progressive web application, designed to transform collected soil health data into comprehensive, exportable reports. Building on the app's capabilities for data access and in-field data collection, these modules enable users to generate reports based on filtered data. Report content can be reviewed and adjusted through an interactive form interface within the app and then exported directly to PDF format using the browser. By converting dispersed measurements and tabular data into clear, portable reports, the report generation modules support farmers, researchers, and policymakers in interpreting soil data more effectively.

1. Introduction

The AI4SoilHealth app is a Progressive Web Application that integrates diverse data sources, ground observations, sensor measurements, laboratory data and Earth Observation products, into a unified environment for soil health assessment and analysis. Deliverable D4.10 focuses on the next step in this workflow: generating structured reports from the data that users explore within the app.

The report generation modules enable the creation of comprehensive reports, supporting document editing, preview, and exporting. Users can select tabular data through the app's filtering tools, review it in an interactive preview, and export the final report as a PDF using the client-side jsPDF library.

2. Application Functionalities for Report Generation

The report generation modules are key features of the AI4SoilHealth app, designed to convert collected data into structured, shareable outputs. They build on the app's capabilities for accessing tabular datasets, allowing users to focus on the specific subset of data most relevant to their analysis or reporting needs. Through an intuitive interface for data selection, an interactive report preview form, and seamless client-side export, these modules streamline the process of transforming dispersed measurements and attributes into clear, portable reports that support soil assessment and informed decision-making.

2.1. Report data selection

The application is published at https://dashboard.ai4soilhealth.eu.

Before logging in, users can access the home page of the application (Fig. 2.1), which features a standard menu and a toolbar at the top of the screen.

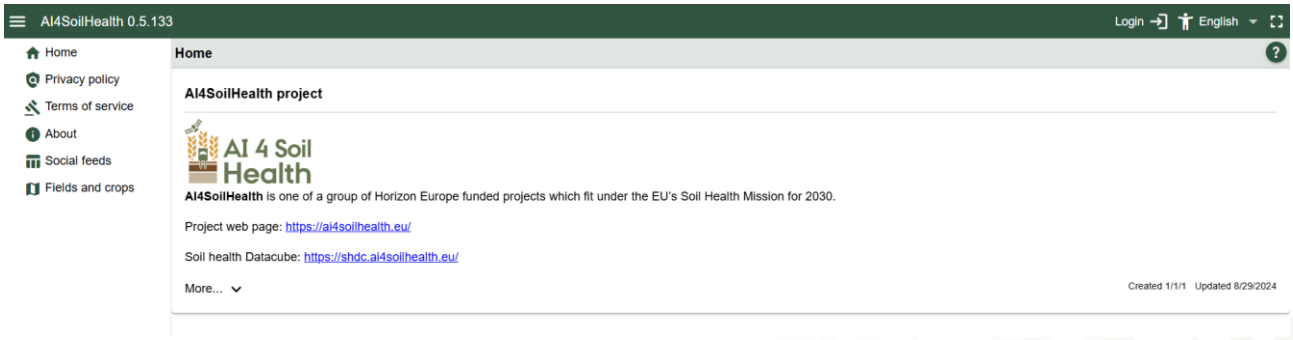

Fig. 2.1 Home page of the application, as seen by an unauthorized user

To view the available data, the user must log in. After the user logs in and is authorized, the main menu expands based on the user's role (Fig. 2.2).

Reports can be created for any tabular dataset. Pages containing tables are marked with a table icon next to their name in the main menu on the left side of the interface. For example, the *Files* page is labeled with a table icon, as shown in Fig. 2.2. To create, edit, or download a report, a page containing tabular data must first be opened. To demonstrate the report functionality, we expand the *Sources* section and open the table named *Croatia*. This page displays the title, a table toolbar, and the table data (Fig. 2.3). Within the toolbar, there is a button labeled "PDF." Hovering over it reveals a tooltip with the text "Edit report definition." Clicking this button opens the interactive report preview form in a popup window. If a report already exists for the selected table, it will load automatically; otherwise, a new report definition will be created and opened. For tables that already have a saved report definition, an additional button with an eye icon appears on the right side of the toolbar. Its tooltip reads "View PDF report." Clicking this button opens a popup window containing the generated PDF document. The report is displayed using the browser's built-in PDF viewer, allowing users to search, zoom in and out, and download the document.

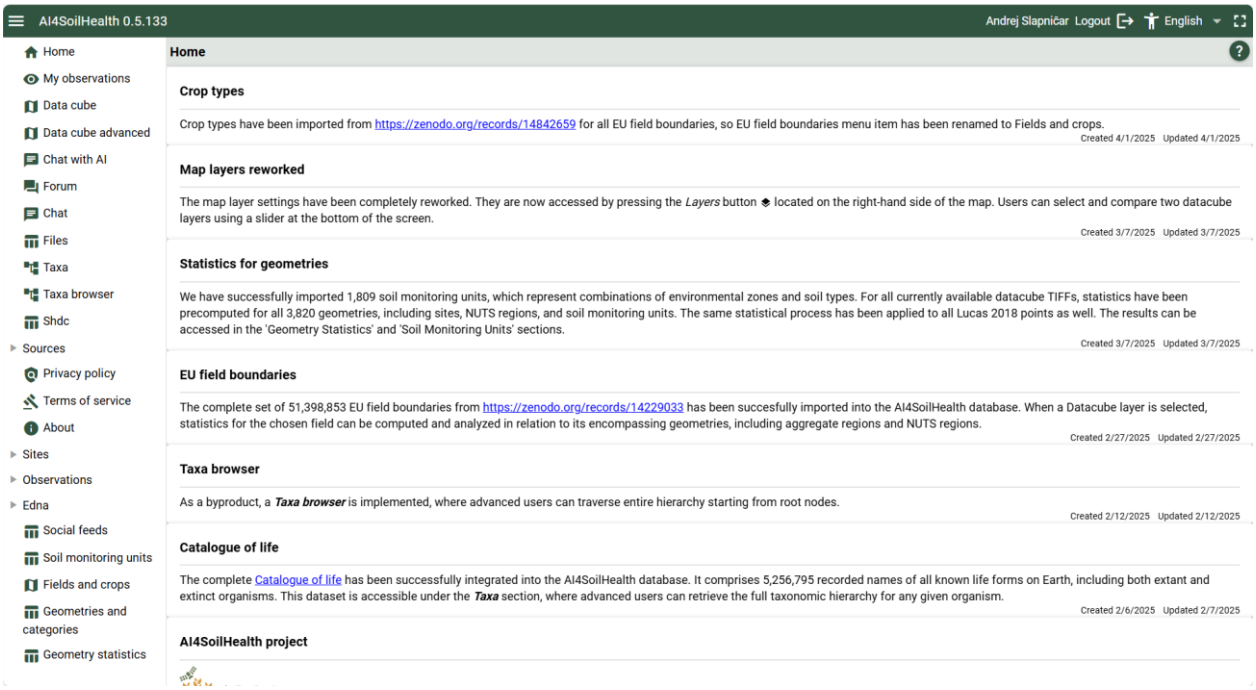

Fig. 2.2 Home page of the application, as seen by user authorized as *Admin*

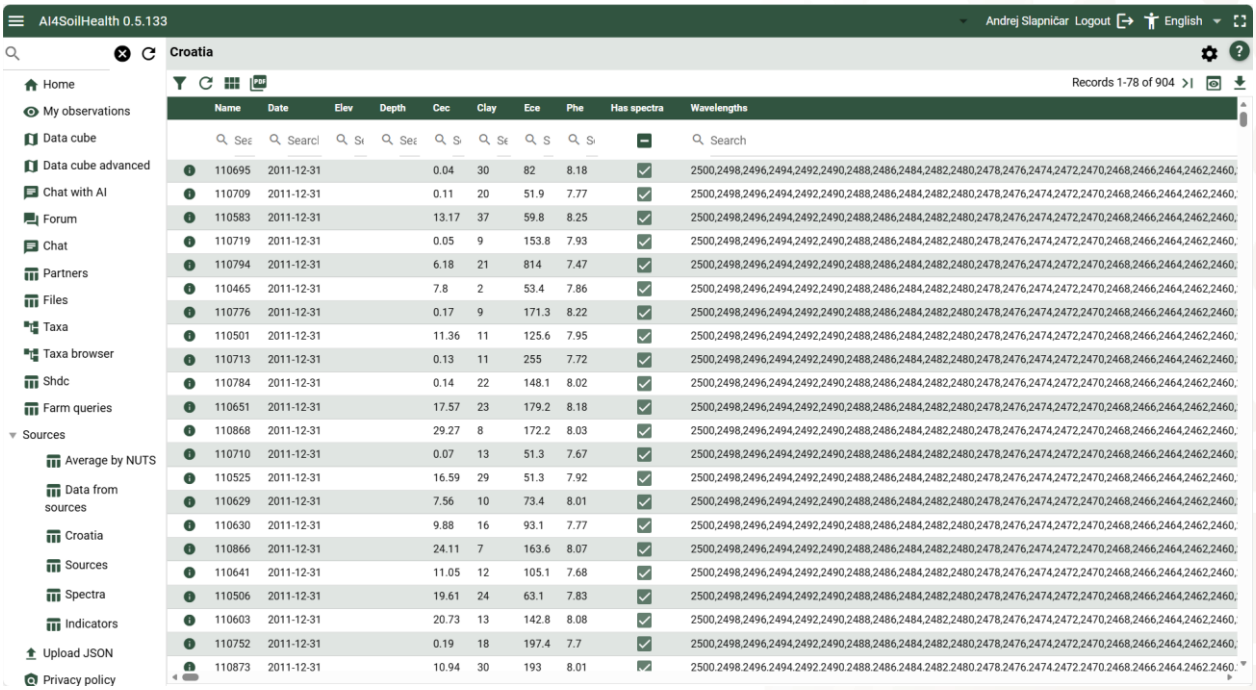

Fig. 2.3 Page for table *Croatia*

2.2. Interactive report preview form

The popup window containing the interactive report preview form includes a title, a report toolbar, a formatting toolbar, and the preview area (Fig. 2.4).

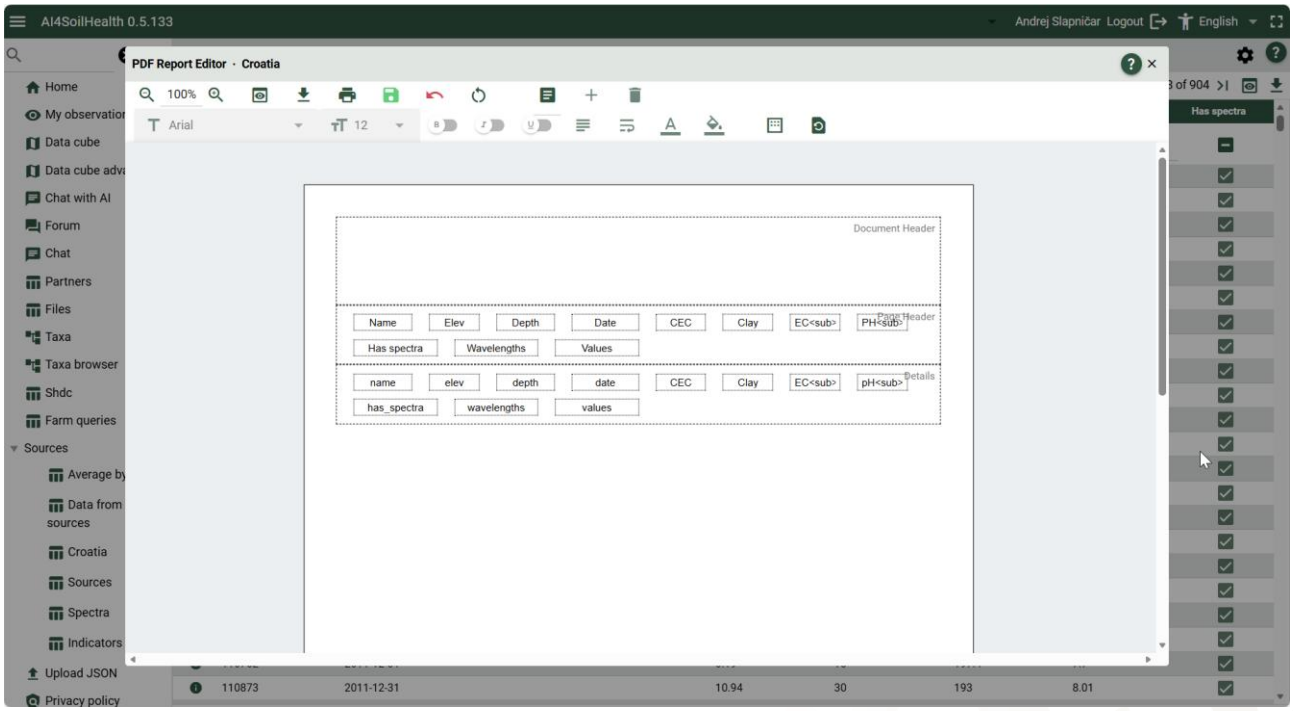

Fig. 2.4 Popup window with interactive report preview form for table *Croatia*

The report toolbar provides the following functionalities:

- Zoom out: Decreases the zoom level.
- Set zoom level: Allows setting a custom zoom percentage.
- Zoom in: Increases the zoom level.
- Print preview: Opens a popup window to preview the report as a PDF document.
- Download: Downloads the report as a PDF document.
- Print: Opens the browser's print dialog for the generated PDF.
- Save report: Saves the current report definition.
- Undo changes: Reverts changes made since the last save.
- Reload: Reloads the data for the report.
- Sections: Allows users to choose which sections of the report are visible. Available sections include: "Document header," "Page header," "Details," "Page footer," and "Document footer."
- Add element: Adds an element to the selected section. Available elements include text, images, and page numbers.
- Delete elements: Removes the selected element or elements from the currently selected section.

To add or delete elements, the appropriate section must first be selected. Otherwise, the buttons for adding or deleting elements will remain disabled. For example, to add a title to the document header, select the “Document header” section, click the plus icon to add an element, and then choose the “Add text” option (Fig. 2.5). An empty text element will be inserted into the selected section (Fig. 2.6). You can then click inside the element to edit the text and enter the document title, such as “Data report for table Croatia” (Fig. 2.7).

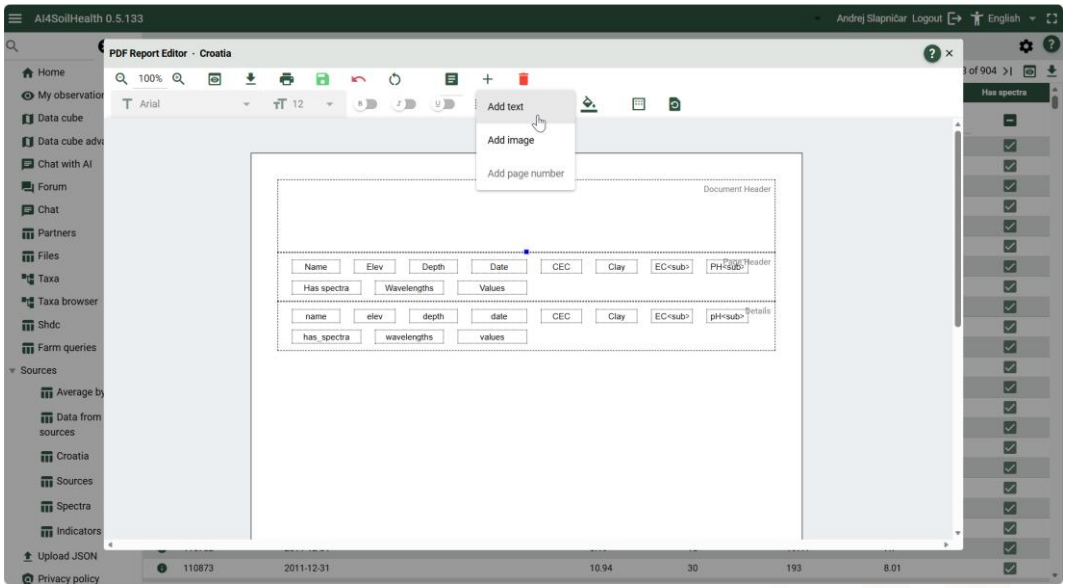

Fig. 2.5 Adding text element by using button “Add element” in the report toolbar

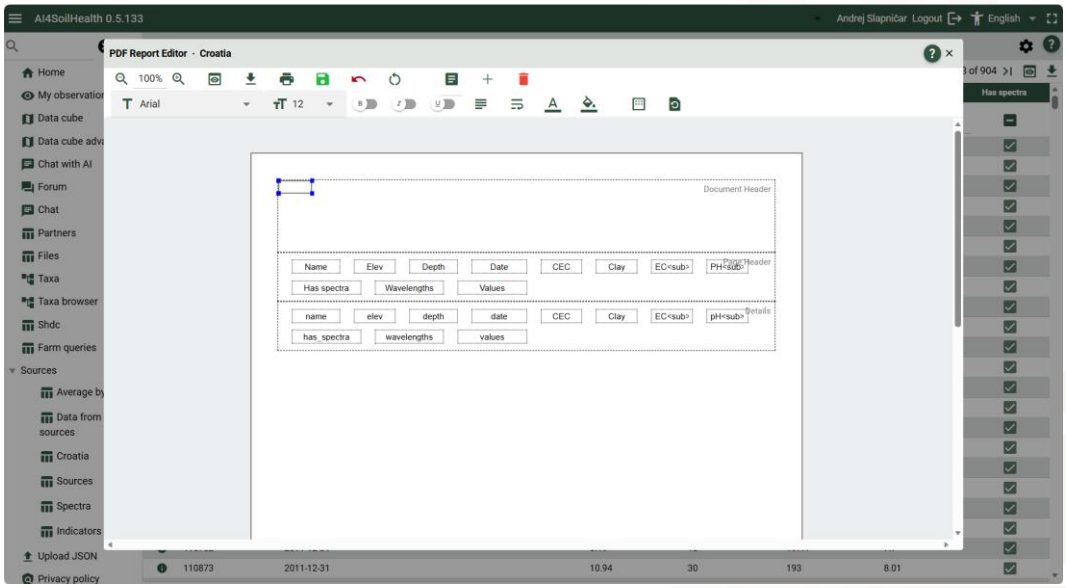

Fig. 2.6 Interactive report preview form with empty text element added to section “Document header”

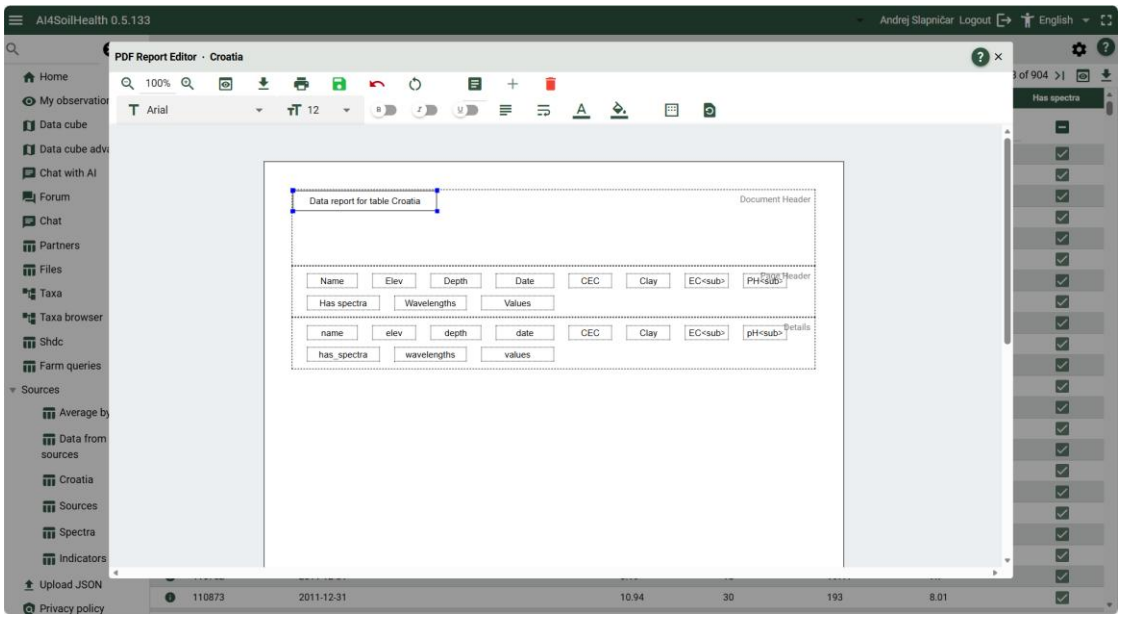

Fig. 2.7 Interactive report preview form with text element for title “Data report for table Croatia”

Image elements can also be added. For example, to insert the project logo into the document footer, select the “Document footer” section, click the plus icon to add an element, and then choose the “Add image” option (Fig. 2.8).

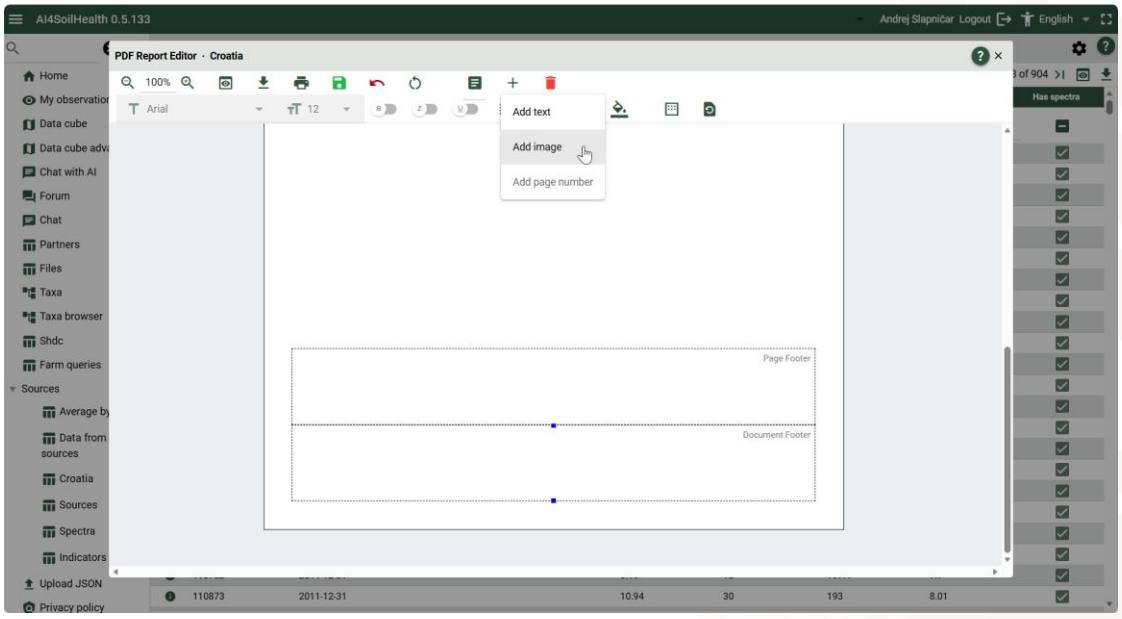

Fig. 2.8 Adding image element by using button “Add element” in the report toolbar

After that, a popup form will appear where the image URL can be entered (Fig. 2.9). Clicking the “OK” button confirms the URL, and the image will be added to the selected section, “Document footer” (Fig. 2.10).

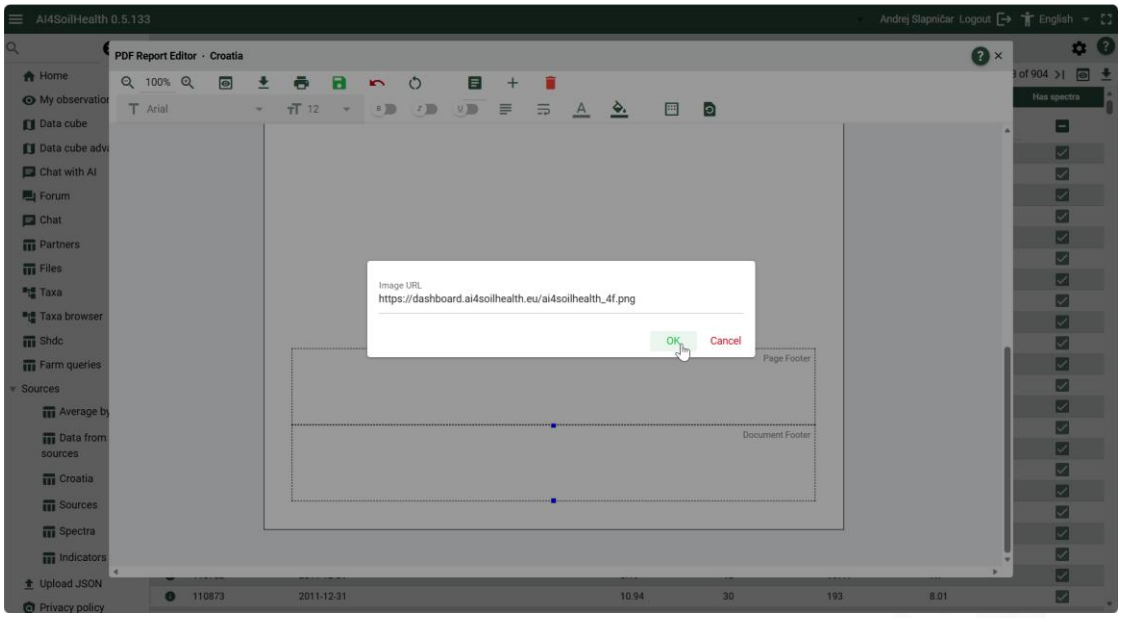

Fig. 2.9 The popup form for entering the image URL

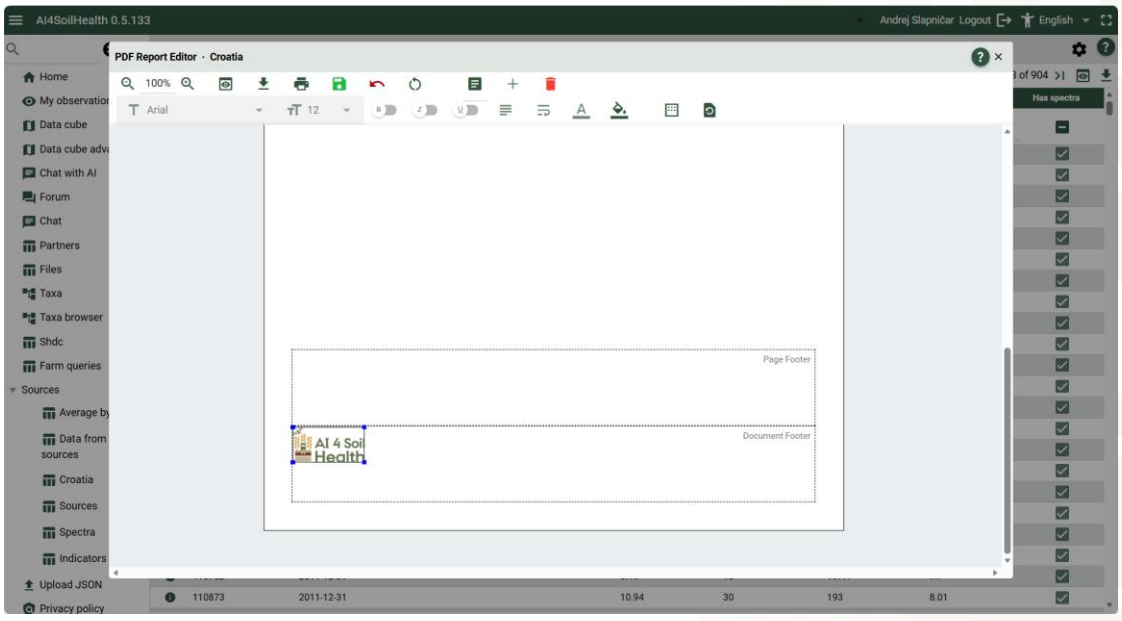

Fig. 2.10 Interactive report preview form with image element for the project logo

Page numbers can be added to the “Page header” and “Page footer” sections. To insert page numbering at the bottom of the page, select the “Page footer” section, click the plus icon to add an element, and then choose the “Add page number” option (Fig. 2.11).

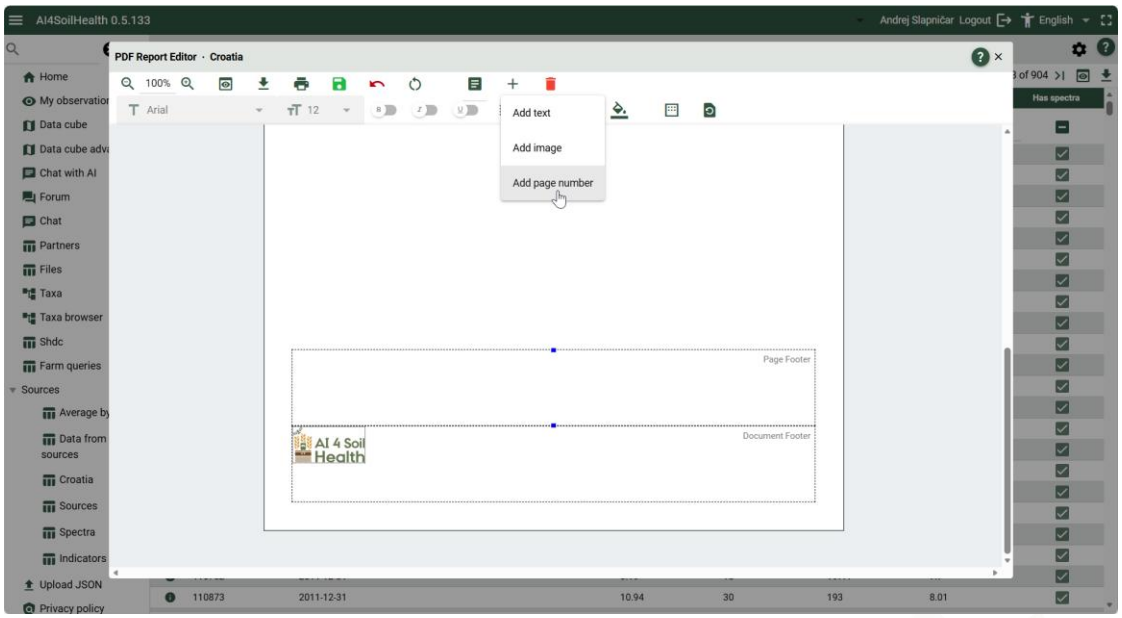

Fig. 2.11 Adding page number element by using button “Add element” in the report toolbar

To add a text element, a section must first be selected.

The formatting toolbar includes buttons for text formatting, color settings, and page layout options. To modify an element's formatting, the element must be selected by clicking on it; otherwise, the formatting buttons will remain disabled.

The font of an element can be customized using the following options:

- Font name: Select the font from a dropdown menu.
- Font size: Choose the desired font size from a dropdown menu.
- Bold: Apply bold formatting to the text.
- Italic: Apply italic formatting to the text.
- Underline: Underline the text.

Other element formatting options are:

- Align text: Set text alignment to one of the following: "Align left," "Center," "Align right," or "Justify."
- Wrap text: Choose a text wrapping mode: "Overflow," "Wrap," or "Clip."
- Text color: Set the text color using the color picker menu.
- Fill color: Set the background color of the element using the color picker menu.

The color of the element, both text color and fill color, can be set statically by selecting a specific color in the color picker menu (Fig. 2.5), meaning the element will always appear in that chosen color. Alternatively, the color can be set dynamically using color rules. At the top of the color picker menu, there is a toggle button to enable or disable color rules. When enabled, conditional formatting rules can be defined. For example, a rule can specify that if a value is greater than 10, the element's color should be red, or if a value starts with "A," the color should be blue (Fig. 2.6). A default color can also be specified, which will be applied if none of the defined rules match the element's value, e.g. setting green as the fallback color (Fig. 2.6).

The last two buttons in the formatting toolbar are used to adjust page settings:

- Adjust margins: Set the page margins to one of the following presets: "Narrow," "Moderate," "Normal," "Wide," or "Custom." A toggle button is also available to show or hide page margins in the preview form.
- Page orientation: Set the page orientation to either "Portrait" or "Landscape."

After configuring the layout, inserting elements, and applying formatting options such as conditional coloring, the final PDF report can be generated. An example of the resulting output is shown in Fig. 2.12, demonstrating how structured data is transformed into a clean, exportable report.

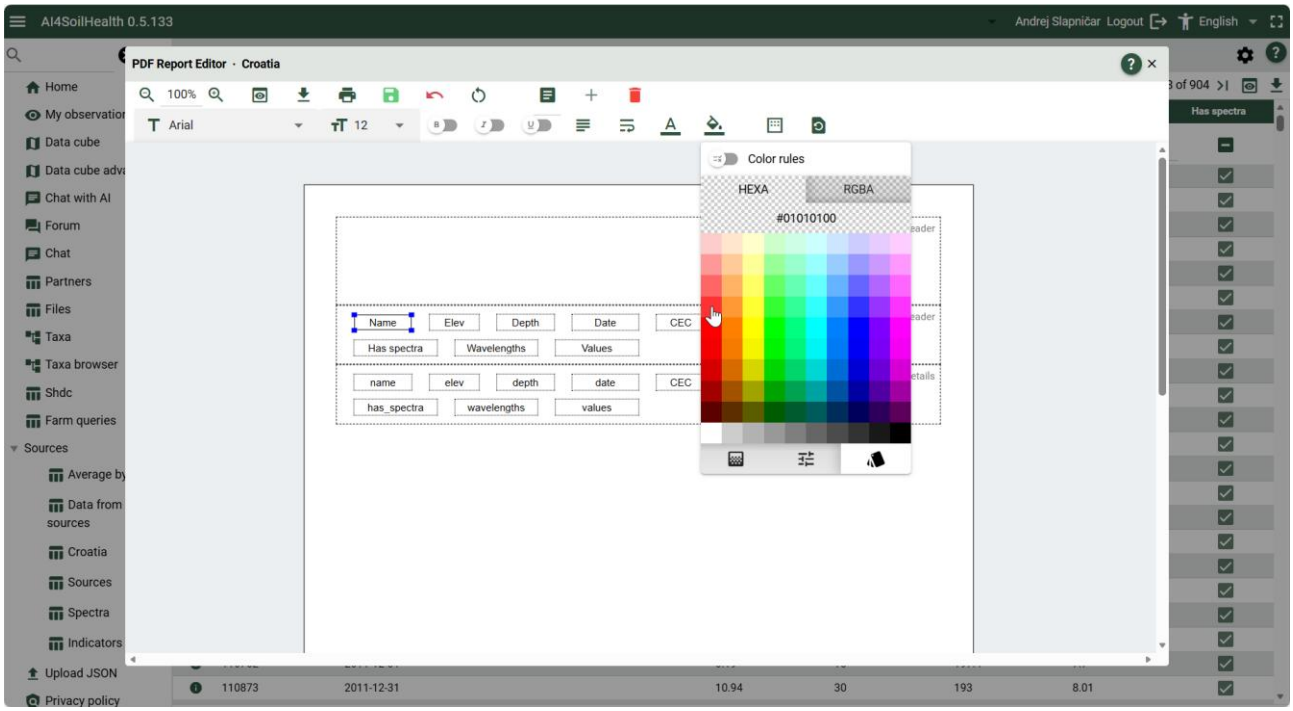

Fig. 2.12 Color picker menu for setting the fill color of the selected element

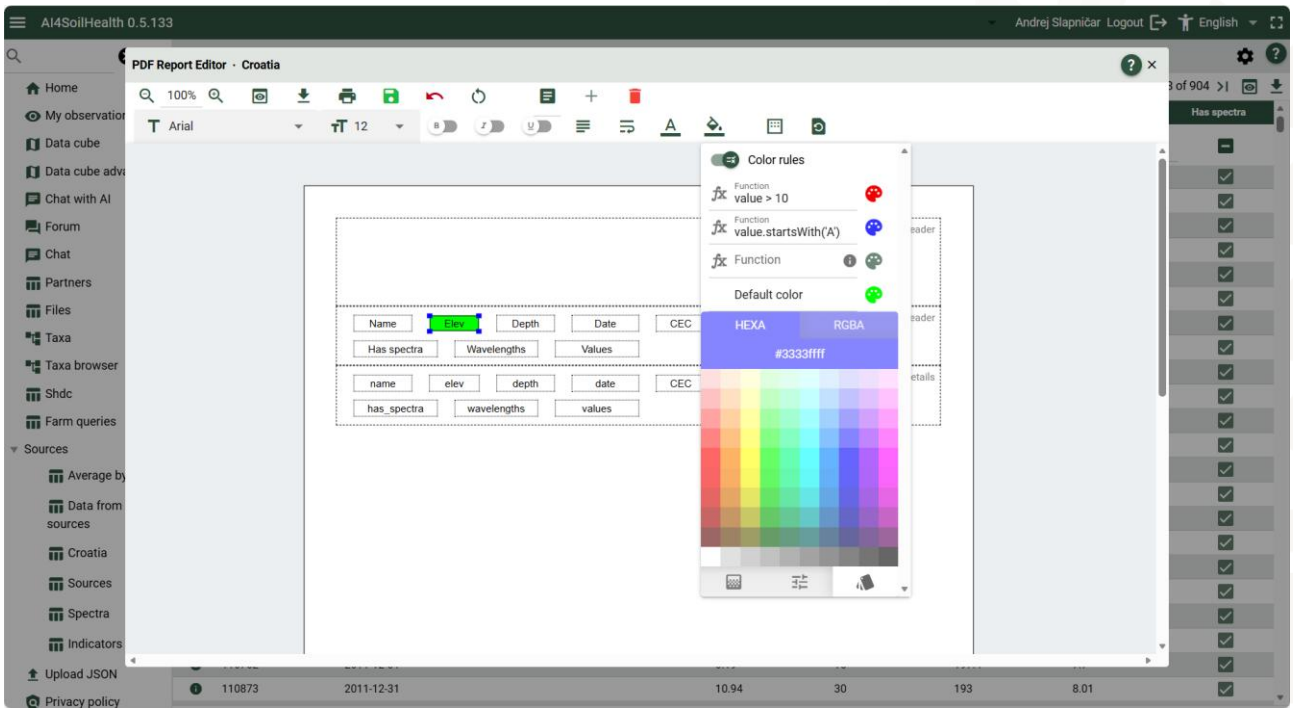

Fig. 2.13 Color menu with color rules enabled for setting the fill color of the selected element

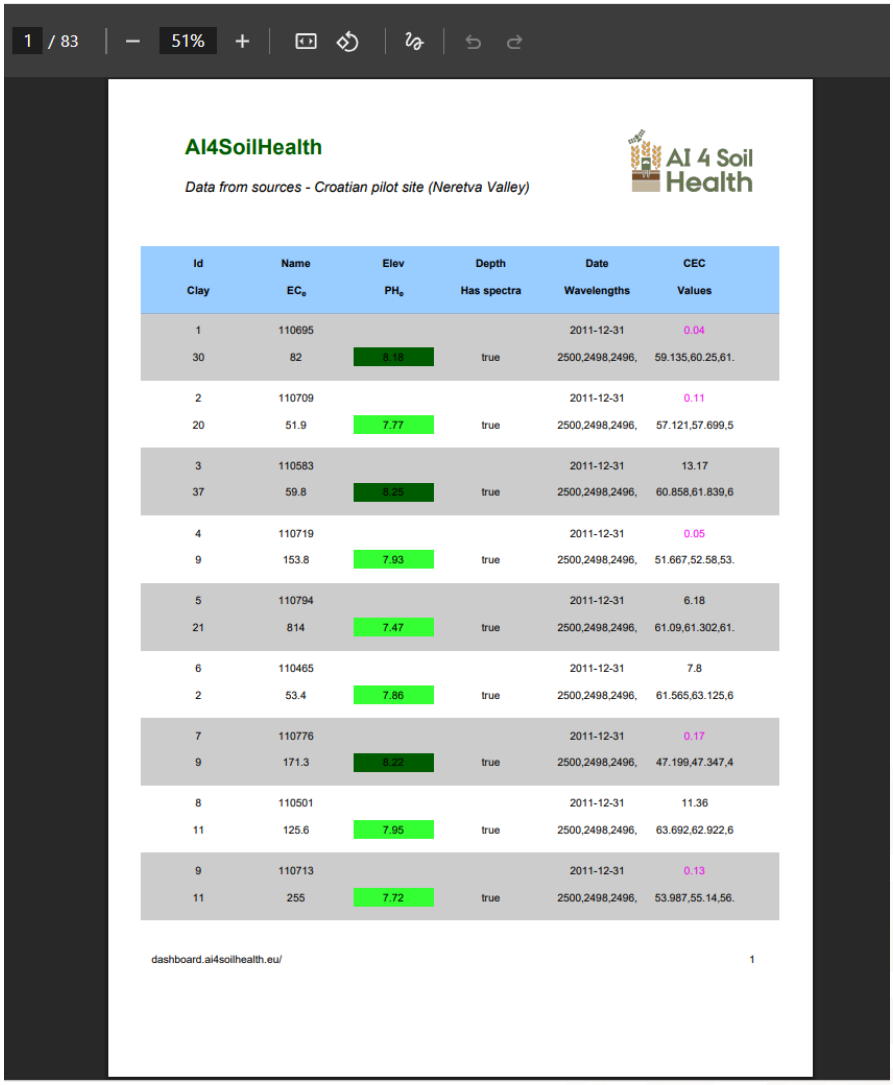

Fig. 2.14 Example of a generated PDF report

3. Conclusion

The Report Generation modules provide a flexible and intuitive system for transforming filtered tabular data into structured, shareable reports within the AI4SoilHealth app. They enable users to select, customize, and preview report content, and then export it directly to PDF format. The interactive report preview form supports dynamic editing, layout customization, and visual formatting, giving users precise control over how their data is presented.

Ongoing and future development will focus on enhancing visual styling and formatting options within the report editor, as well as achieving tighter integration with in-field and laboratory data collection modules. These improvements aim to make the report generation workflow even more efficient and user-friendly, ensuring it remains a key tool for converting soil health data into actionable and communicable outputs for a wide range of users.

References

Mornar, V. & Bagić Babac (2023), D1.6 Technical specifications of digital infrastructure and AI4SoilHealth services, AI4SoilHealth Horizon Europe project no. 101086179