



D2.5 – Visualisation Platform of Digital Agriculture & Forestry Uptake – Version 1

**Work Package 2 - Uptake of Digital Agriculture & Forestry
Technologies**

Authors: Javier Lois (VIZ), Susana Romao (VIZ)

Date: 16.12.2024



**Funded by
the European Union**

Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.

Full Title	4Growth - Digital Agriculture and Forestry: Understanding the Market to Forecast and Support Future Growth		
Project number	101082130	Acronym	4Growth
Start date	01.01.2024	Duration	36 months
Granting authority	European Research Executive Agency (REA)		
Project Coordinator	STICHTING WAGENINGEN RESEARCH (WR)		
Date of delivery	Contractual	M6	Actual M12
Type	OTHER	Dissemination level	SEN - Sensitive
Lead beneficiary	Vizzuality		
Lead author	Javier Lois (Vizzuality)	Email	Javier.lois@vizzuality.com
Other authors	Susana Romao (Vizzuality)		
Reviewer(s)	Susana Romao (Vizzuality), Daire Boyle (Evenflow)		
Keywords	Monitoring; Visualisation; 4Growth		

Document Revision History				
Version	Issue date	Stage	Changes	Contributor
1.0	16.12.2024	Draft	First Issue	VIZ
1.1	17.12.2024	Final	Reviewed	VIZ / EVF
1.2	20.12.2024	Final	Last edition	WR

Disclaimer

Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.

Copyright message

© 4Growth consortium, 2024

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgment of previously published material and of the work of others has been made through appropriate citation, quotation or both. Reproduction is authorised provided the source is acknowledged.

Contents

Introduction	5
Outline of the Data Visualization platform	5
Explore screen	6
Filters	6
Sections navigator	7
Data visualisation sections	8
Sandbox	13
Settings	14
Filters	15
Saving visualisation	16
User screens	16
User registration	16
User login	17
User profile screen	18
Architecture and other technical considerations	19
High-level Architecture Overview	19
Core Components and Services	19
Hosting and Infrastructure	20
Next Steps	20

Table of Figures

Figure 1 - Explore screen	6
Figure 2 - General filters	6
Figure 3 - custom filter	7
Figure 4 - Sections menu on the sidebar	7
Figure 5 - Sections: shortcut set of buttons	8
Figure 6 - Overview section	8
Figure 7 - General information	9
Figure 8 - Governance model	9
Figure 9 - Adoption of digital technologies	10
Figure 10 - Technology performance	10
Figure 11 - Data management and data sharing practices	11
Figure 12 - Social benefits and impact	12
Figure 13 - Economic benefits and impact	12
Figure 14 - Environmental and sustainability impact	13
Figure 15 - Future Outlook	13

Figure 16 - Sandbox screen	14
Figure 17 - Sandbox settings	14
Figure 18 - Sandbox filters	15
Figure 19 - Data breakdown.....	15
Figure 20 - Sandbox: save visualisation	16
Figure 21 - User registration screen	16
Figure 20 - User registration screen	17
Figure 22 - Password reset.....	17
Figure 23 - User login.....	17
Figure 24 - User profile screen.....	18
Figure 25 - High-level architecture.....	19

Introduction

As part of Task 2.3, a **website application** of the *4Growth Visualisation Platform of Digital Agriculture & Forestry Uptake* was created.

The website is currently password-protected. It is a temporary measure until the consortium decides to go public with the platform. For the moment only a restricted group of people can access the data since we are still in testing phase. The credentials to access the website are as follows:

- URL: <https://staging.4-growth.dev-vizzuality.com/explore>
- Username: 4growth
- Password: ndq!zdv9xga7TED@dhv

This document describes an initial version of the platform, Version 1, delivered in M12. The tool allows users to visualise the uptake of digital technologies within the agriculture and forestry sectors in European countries. The platform intends to make the project insights accessible to a broader community, including decision-makers and actors within the value chains of agriculture and forestry. The 4Growth Visualisation Platform will serve as a source for information and insights derived from the project's activities.

In a future iteration, version 2 (D2.6) of this model will be released, including data projections from the MMFT that are currently not shown in Version 1.

Outline of the Data Visualization platform

The visualisation tool is composed of several screens that contain a series of tools and features to allow the user to visualise the data using different filters and configurations. The high-level structure of the functionality is as follows:

- Explore Screen
 - Filters
 - Sections navigator
 - Data visualisation sections
 - Overview section
 - General Information
 - Governance Model
 - Adoption of digital Technologies and Technology integration
 - Technology performance
 - Data management and data sharing practices
 - Social benefits and impact
 - Economic benefits and impact
 - Environmental and sustainability impact
 - Future outlook
- Sandbox
 - Settings
 - Filters
 - Saving visualisation
- User profile
 - User registration
 - User login

- Saved visualisations
- Account details
- Edit password

Explore screen

The Explore Screen is the initial screen for the data visualisation platform. It allows the user to browse the values of data for different results and filter the data with different criteria to narrow down the results.



Figure 1 - Explore screen

Filters

The visualisation tool gives the user the possibility of filtering the displayed data by different criteria.

The general filters allow the user to filter by area of operation or by country:

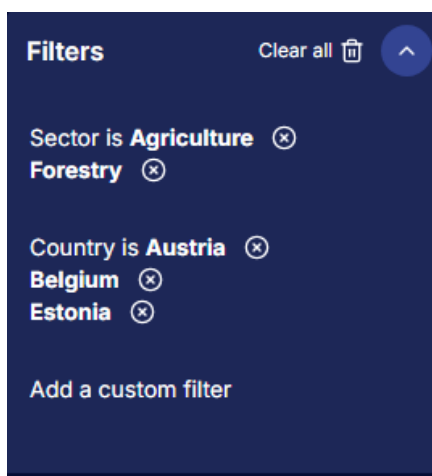


Figure 2 - General filters

There is also the possibility of adding custom filters where you specify values for the different parameters. For example, we can choose to show only the values where the *technology type of agriculture* is *precision farming*.

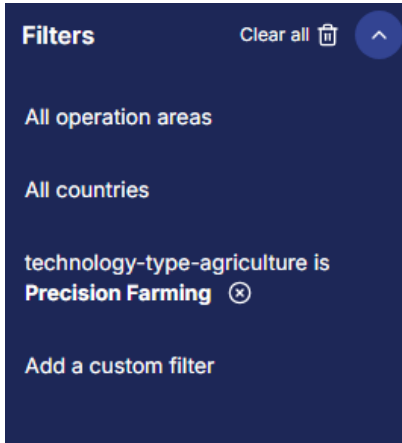


Figure 3 - custom filter

Sections navigator

The results of the data survey are displayed in several sections. We have two ways to navigate directly to these sections: a sections menu on the sidebar and a shortcut list of buttons.



Figure 4 - Sections menu on the sidebar

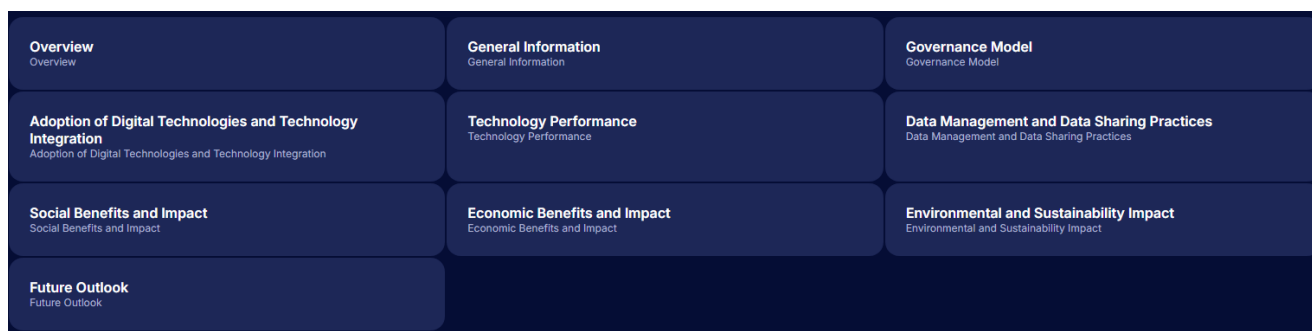


Figure 5 - Sections: shortcut set of buttons

Data visualisation sections

The data visualisation sections display the data using a set of different widgets appropriate for each kind of data.

Each widget has a graph/diagram displaying the information, an indicator of the response rate, and a menu where you can change the type of graph in which the data will be shown.

Overview section

Shows a summary of the data obtained in the surveys, together with a map of Europe showing the adoption of technology by country. This overview adjusts when the user activates the filters. For example, if only one country is selected, the number of total surveys will be shown for the country selected.

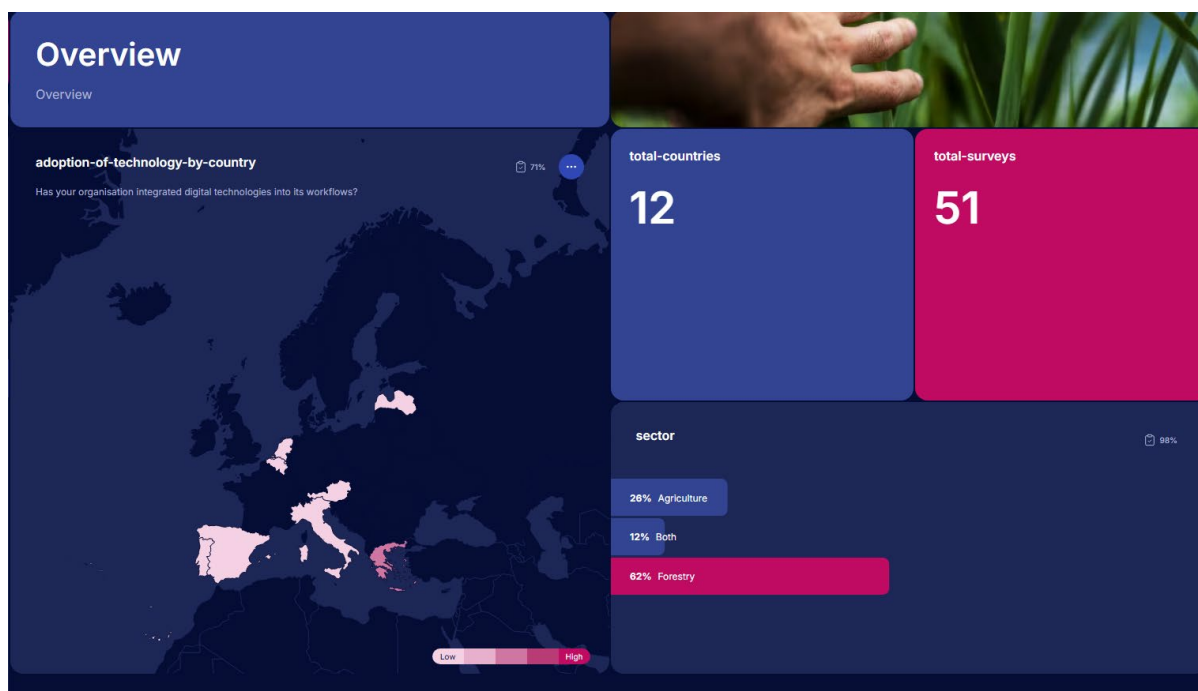


Figure 6 - Overview section

General Information

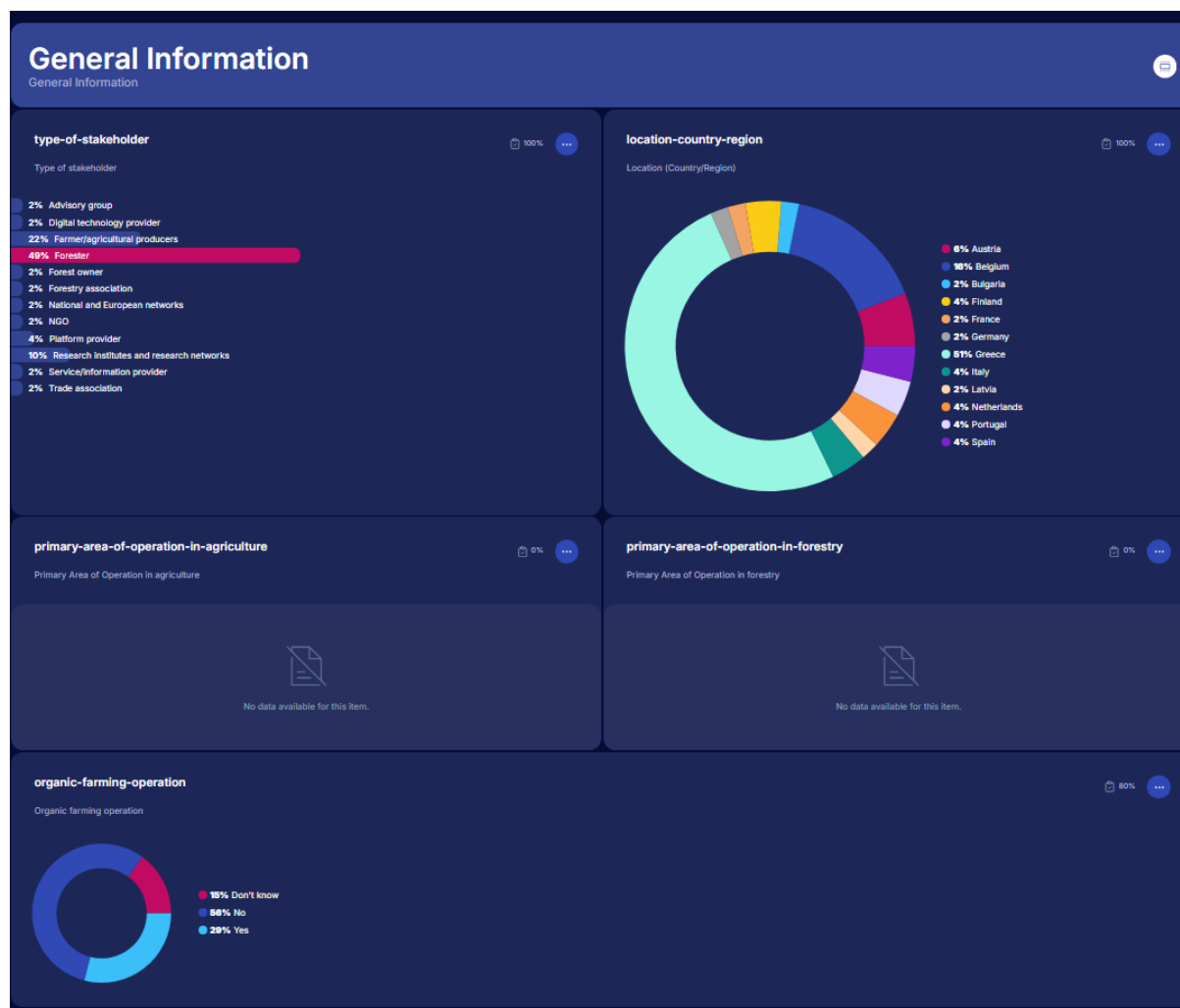


Figure 7 - General information

Governance Model

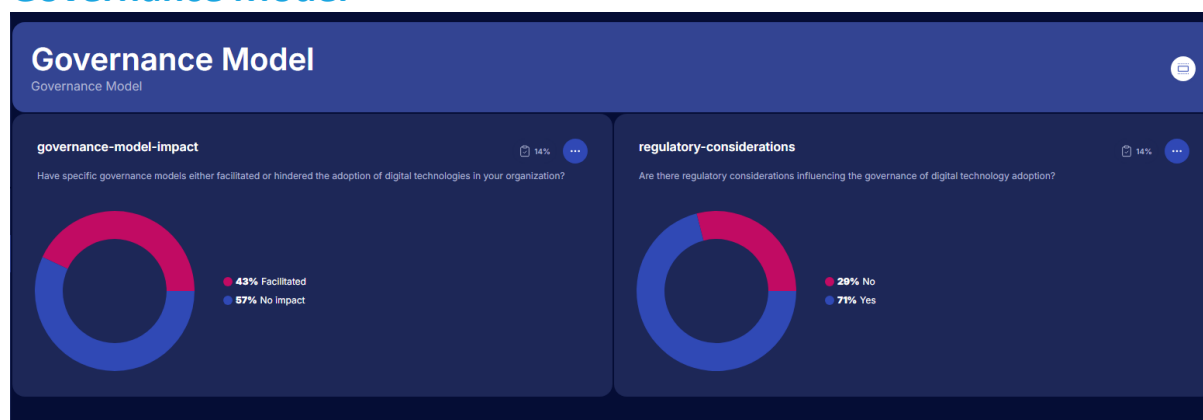


Figure 8 - Governance model

Adoption of digital Technologies and Technology integration

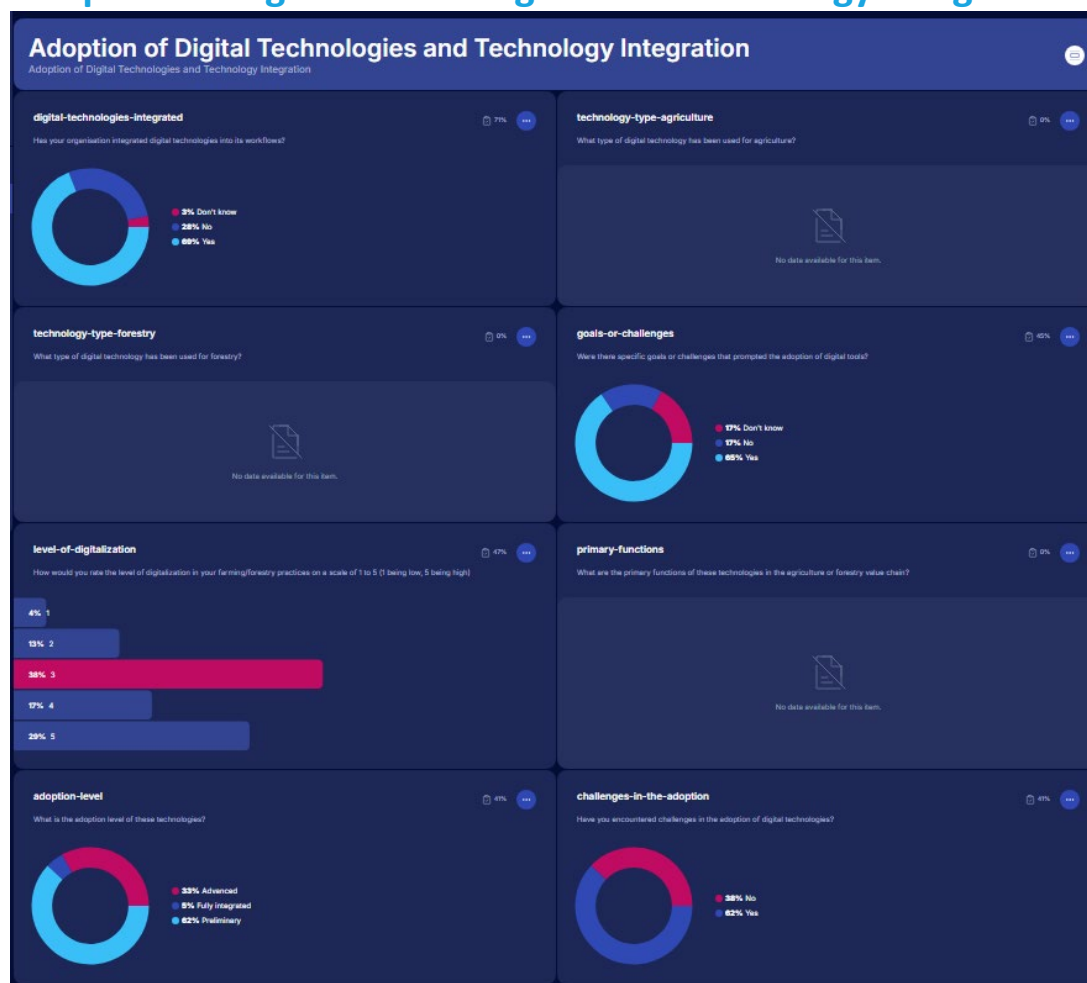


Figure 9 - Adoption of digital technologies

Technology performance

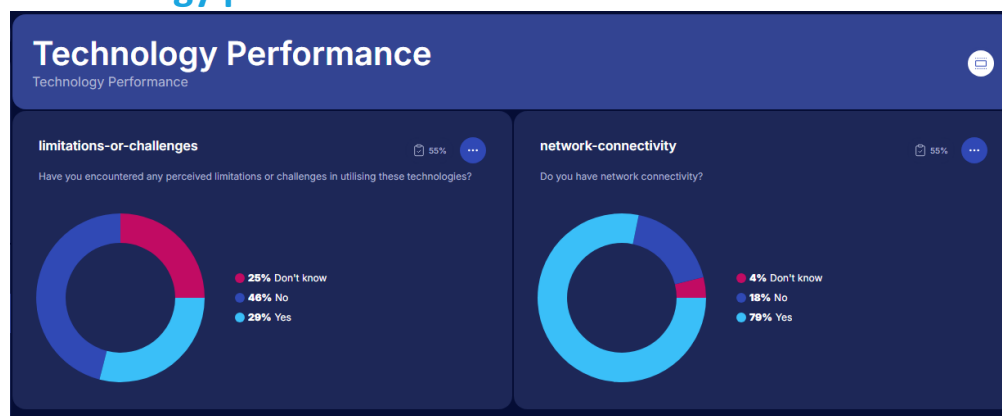


Figure 10 - Technology performance

Data management and data sharing practices

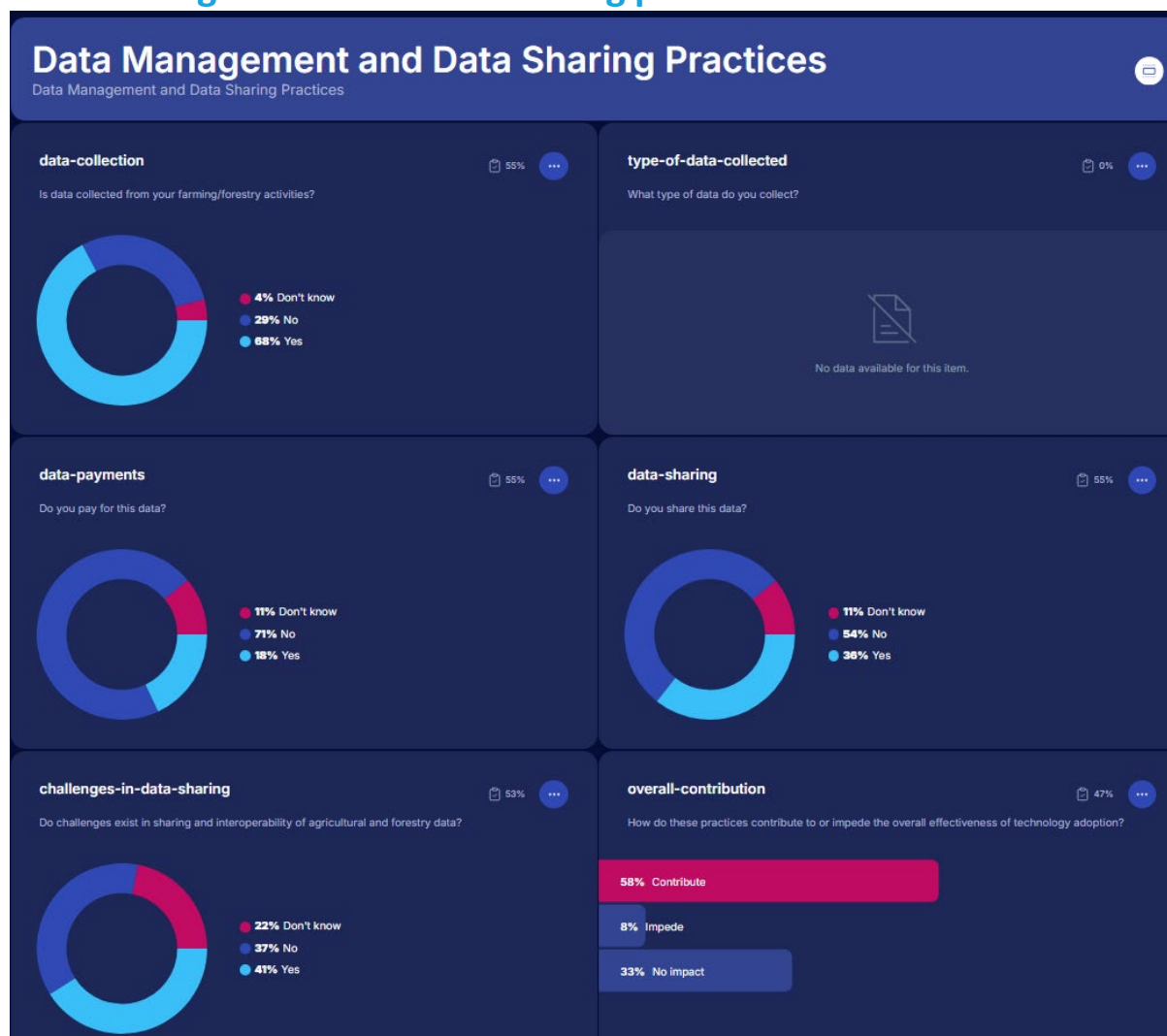


Figure 11 - Data management and data sharing practices

Social benefits and impact

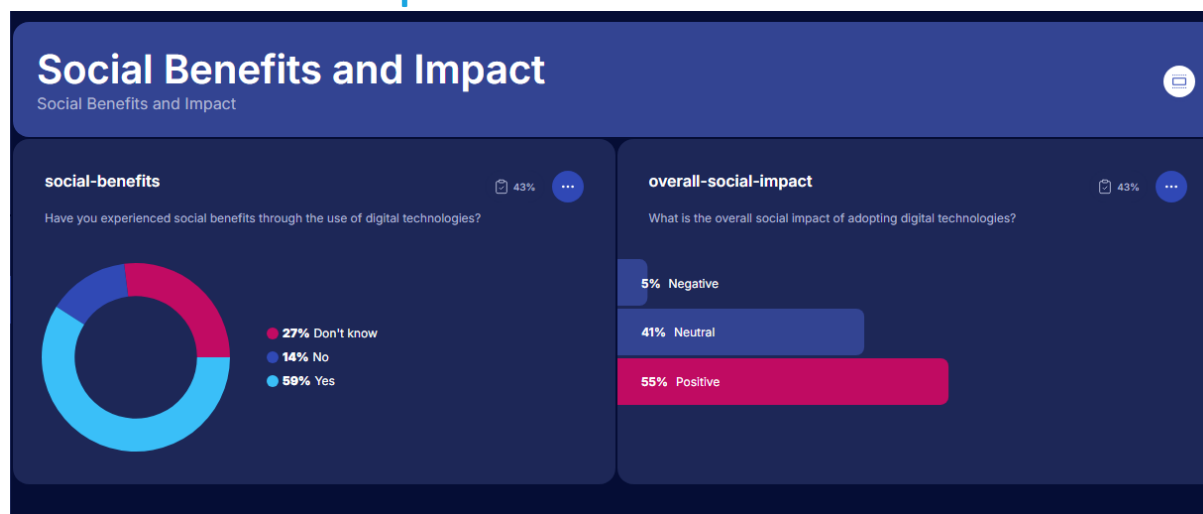


Figure 12 - Social benefits and impact

Economic benefits and impact



Figure 13 - Economic benefits and impact

Environmental and sustainability impact



Figure 14 - Environmental and sustainability impact

Future outlook

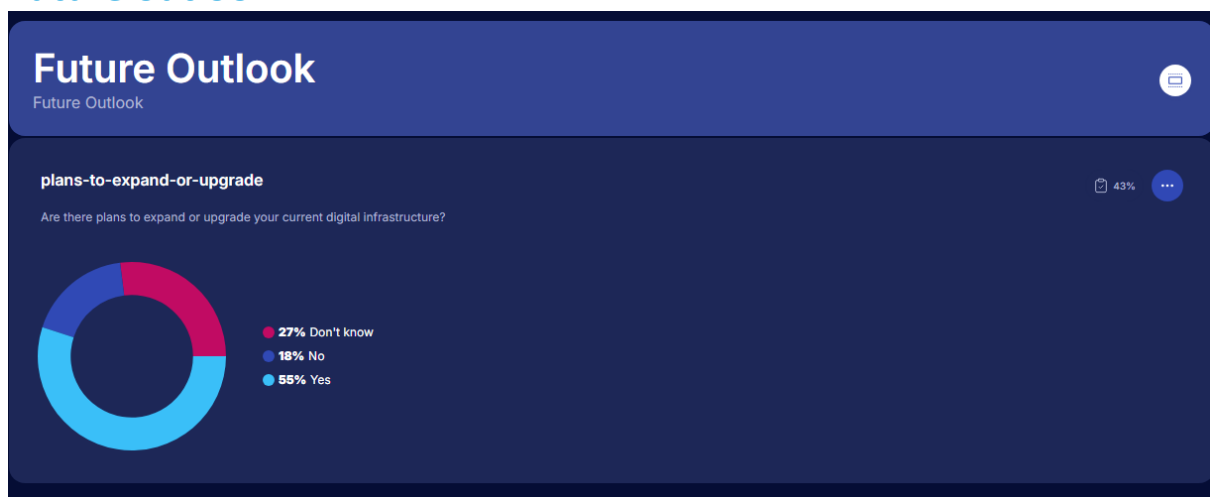


Figure 15 - Future Outlook

Sandbox

The sandbox is a feature that allows the user to choose their own custom visualizations, more configurable than the filters in the explore screen. It also allows the user to save these visualisations in their profile so they can revisit them at a later point in time.

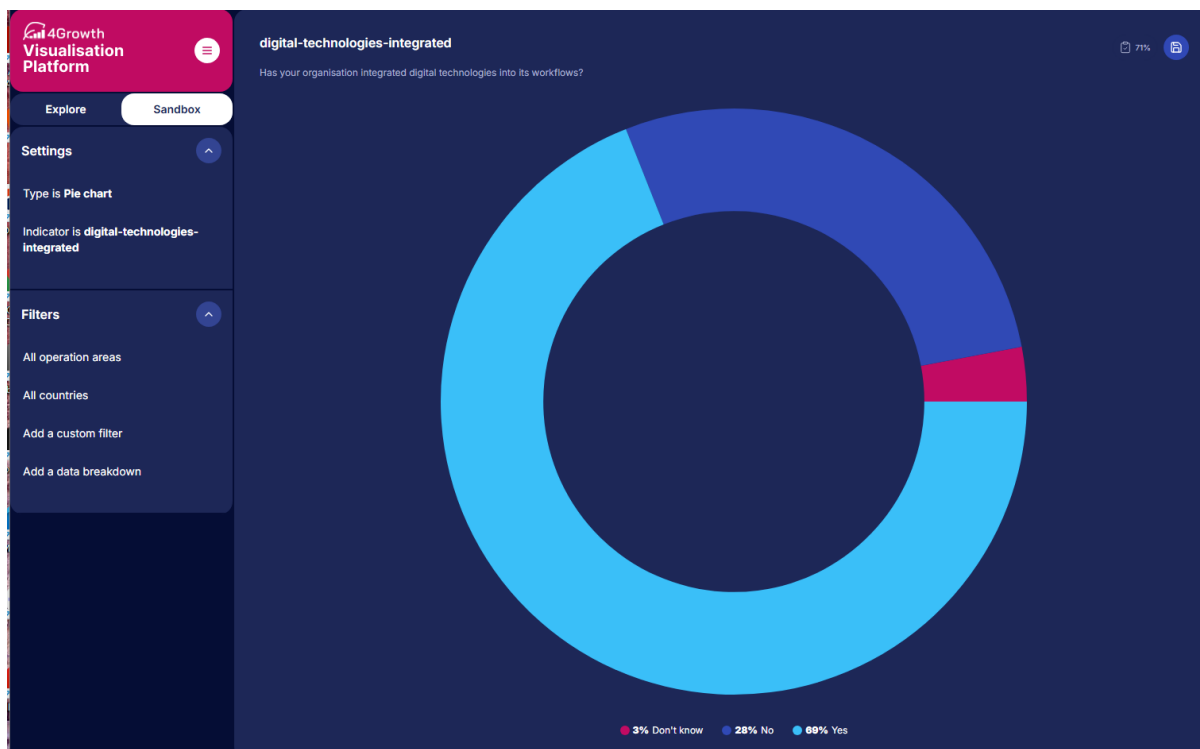


Figure 16 - Sandbox screen

Settings

In the settings screen of the sandbox, you can configure the type of chart that you want to use for the visualisation, and the indicator that you want to visualise.

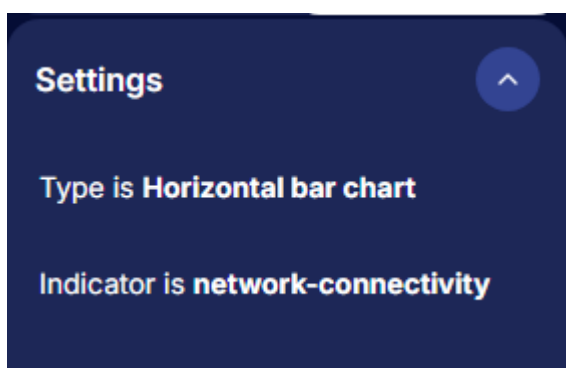


Figure 17 - Sandbox settings

Filters

The users can filter by sector or country, and they can also add custom filters or a data breakdown to combine two indicators.

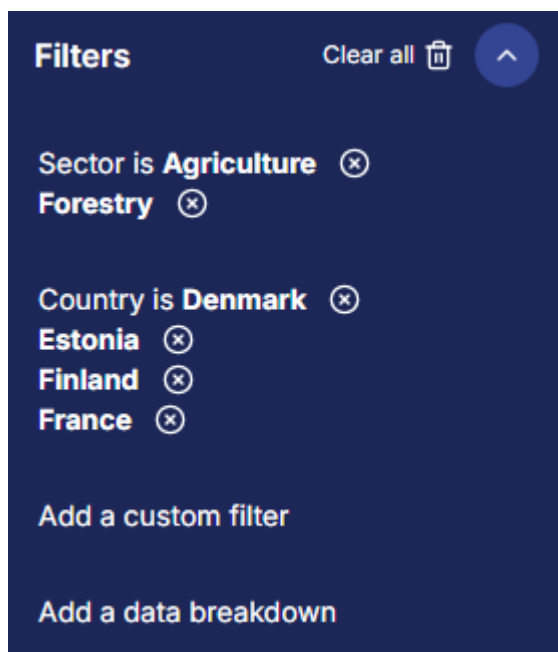


Figure 18 - Sandbox filters

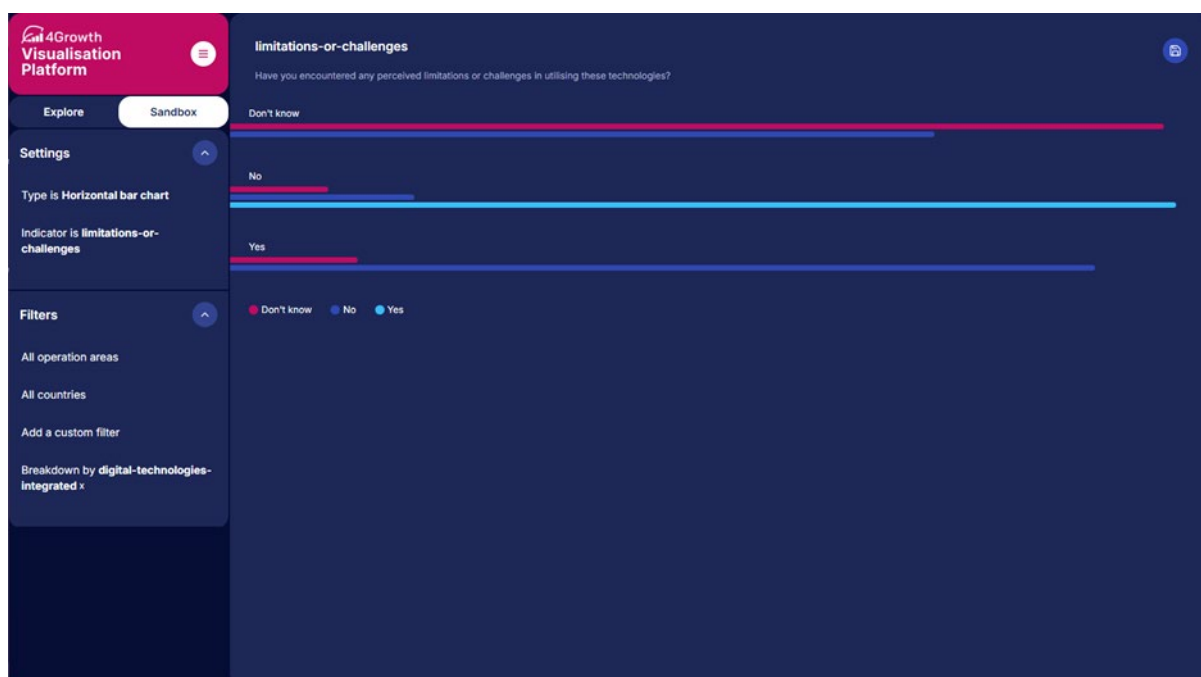


Figure 19 - Data breakdown

Saving visualisation

When users configure a custom view of the data, they can save this visualisation to reuse it later on. this information will be available from the user profile screen.




Figure 20 - Sandbox: save visualisation

User screens

Users have the possibility of creating a profile account in the platform so that they can store and recover their custom visualisations. This is optional and the tool can be used without registration.

User registration

The user can create an account to save their custom visualisations. The application will request an email address to identify the user, and also the definition of a password.

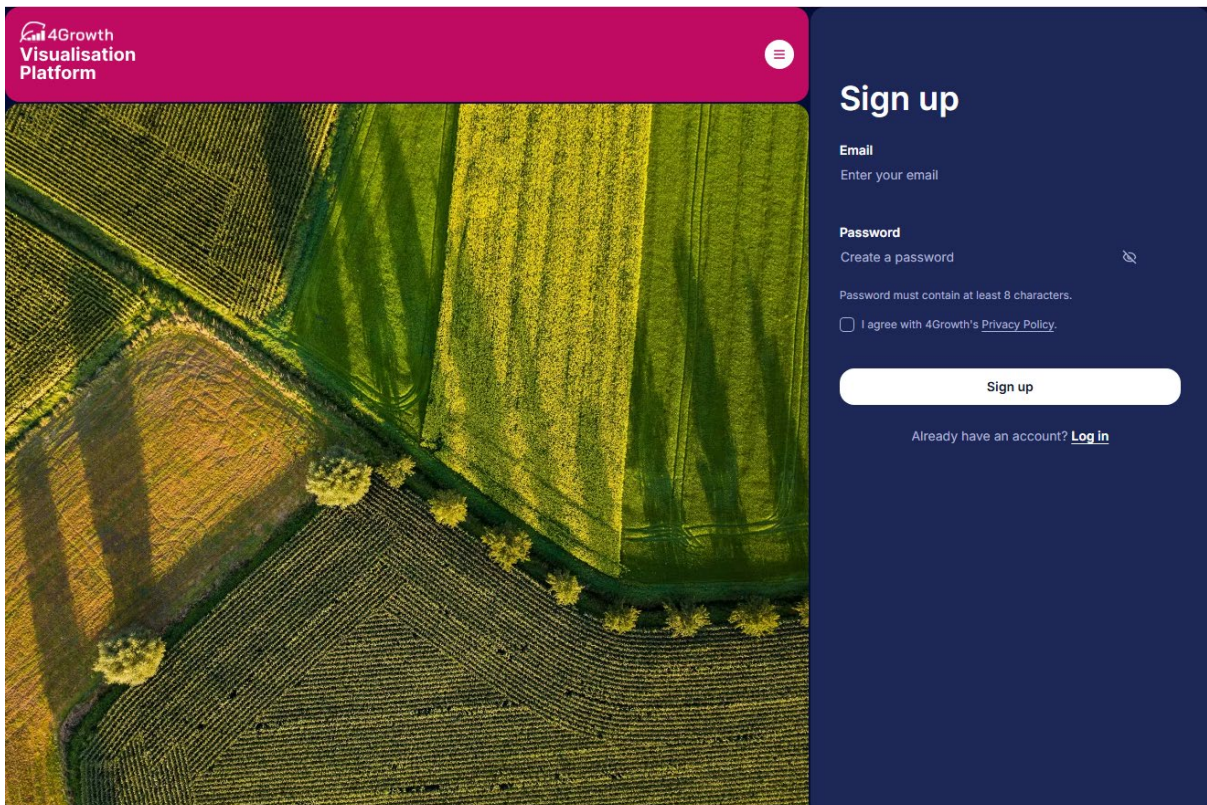
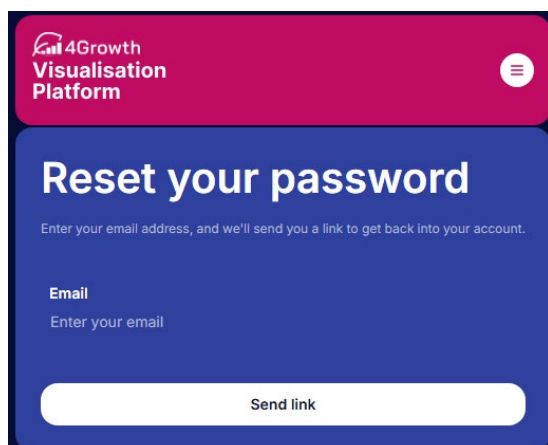


Figure 21 - User registration screen

Figure 20 - User registration screen

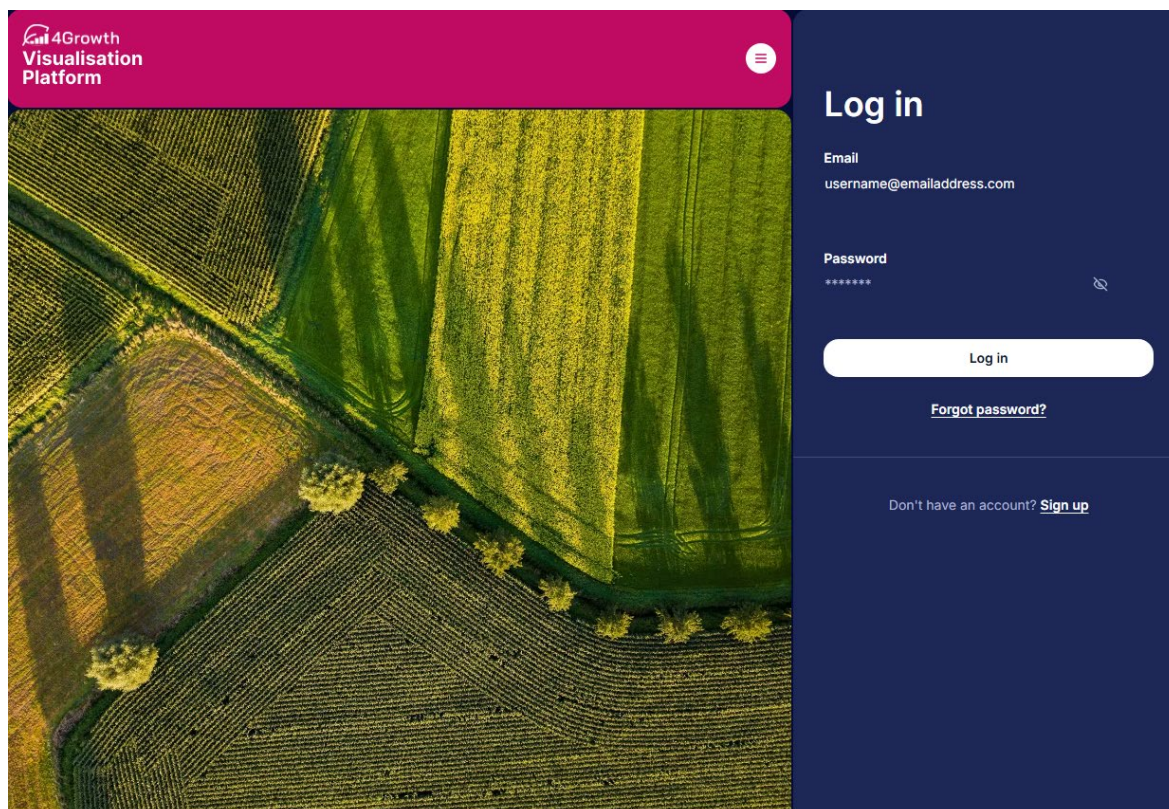
User login

The users can log into their user account using the login screen. They can also recover their password if it is forgotten.



The screenshot shows the 'Reset your password' screen. At the top, there is a pink header with the '4Growth Visualisation Platform' logo and a menu icon. Below the header, the title 'Reset your password' is displayed in white on a dark blue background. Underneath, a subtitle reads: 'Enter your email address, and we'll send you a link to get back into your account.' There is an 'Email' label followed by a text input field containing 'Enter your email'. At the bottom, there is a white button labeled 'Send link'.

Figure 22 - Password reset



The screenshot shows the 'Log in' screen. It features a pink header with the '4Growth Visualisation Platform' logo and a menu icon. The main area is split into two sections. The left section shows an aerial view of agricultural fields. The right section is a dark blue panel with the title 'Log in' in white. It contains an 'Email' label followed by a text input field with 'username@emailaddress.com'. Below that is a 'Password' label followed by a text input field with masked characters '*****' and a toggle icon. A white button labeled 'Log in' is positioned below the password field. Underneath the button is a link labeled 'Forgot password?'. At the bottom of the panel, there is a link that says 'Don't have an account? [Sign up](#)'.

Figure 23 - User login

User profile screen

A list of the visualisations that the user saved can be seen on the profile screen.

It is also possible to change the email address or the password of the user.

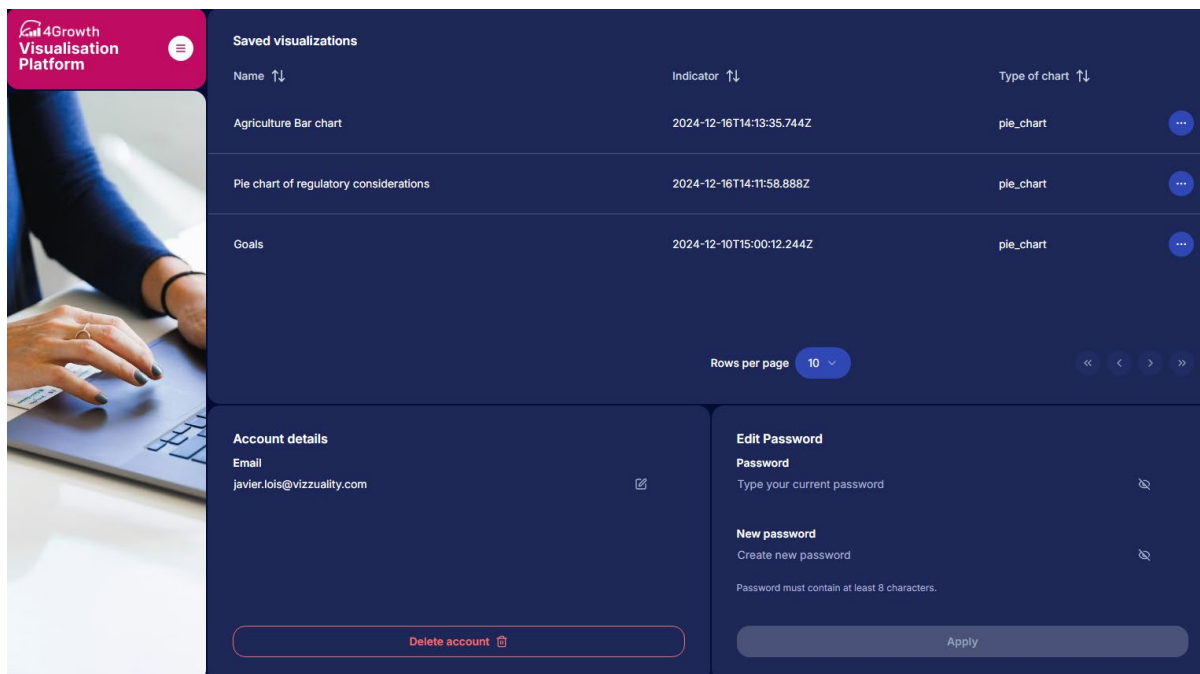


Figure 24 - User profile screen

Architecture and other technical considerations

High-level Architecture Overview

The tool is designed as a modular, open-source platform that centralizes survey data and provides interactive visualization capabilities. Its architecture balances performance, scalability, and usability, ensuring accessibility for diverse stakeholders.

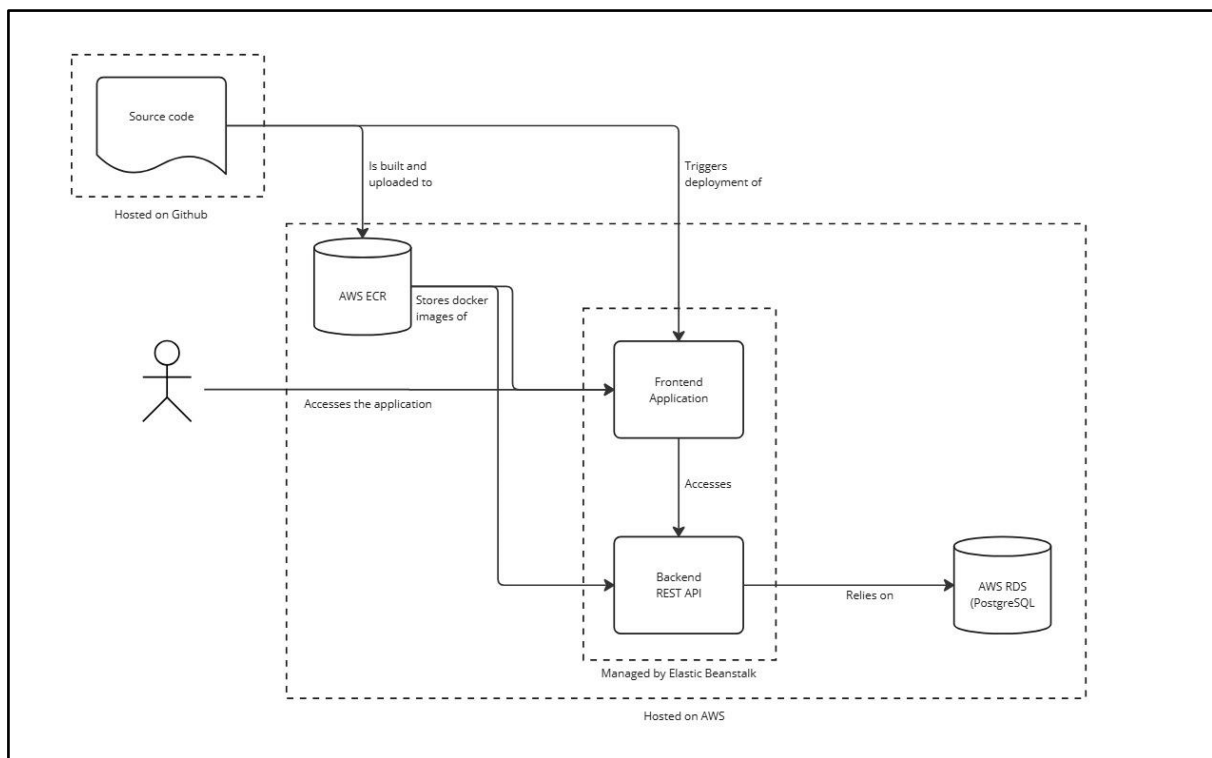


Figure 25 - High-level architecture

Core Components and Services

1. **Frontend application:** A user-friendly web interface built with Next.js and TypeScript, providing data visualizations and exploration features.
2. **Data management API:** A REST API manages and stores data, configuration and metadata for the survey results, enabling dynamic updates without code modifications.
3. **Amazon ECR:** Container registry of the docker images of the Frontend and Backend applications built and deployed during the CI/CD flow.
4. **Data processing and integration:** ETL script triggered manually that imports the survey data and integrates it into our database.

Hosting and Infrastructure

The project's infrastructure is kept using Terraform, found in the /infrastructure folder in the Github repository. The repository can be found in <https://github.com/Vizzuality/4-growth>

The Terraform project manages:

- Basic AWS ElasticBeanstalk configuration (including EC2 and database).
- Github Actions secrets and environment variables.
- AWS user for GH Actions.
- ECR repositories.

The application consists of a monorepo with the frontend and the backend modules dockerized in separate containers.

It also deploys a vanilla nginx docker image (from dockerhub directly) to act as a reverse proxy.

The source code of the FE and BE server apps is kept on Github and, on merge to key branches, respective docker images are built and pushed to AWS ECR.

Currently the application is hosted in a Vizzuality internal subdomain that can be used for dev and staging environments. When the time comes for the application to be made available to the public, it will be transferred to the main domain of the 4Growth project. At that moment it will be required to add the relevant DNS records.

Next Steps

Following this deliverable (D2.5), two more major updates to the 4Growth Visualisation Platform will follow; D2.6 in M22 and D2.7 in M33. These iterations will build upon what has already been developed by integrating the outputs of the Market Monitoring and Forecasting Tool (MMFT), which will produce various projections on the current and future states of the agriculture and forestry technology markets. D2.6 and D2.7 will also ingest and display more of the “ground truth” data gathered via the Grid and Observatories as it is collected.