GO-GRASS Online Decision Support Tool – User Manual

D6.4

DATE : 28.02.2024

AUTHORS (ORGANISATION/COUNTRY) : NATHALIE BARGUES (GREENOVATE! EUROPE)

Technical References

Project Acronym	GO-GRASS
Project Title	Grass-based circular business models for rural agri-food value chains
Grant Number	862674
Project Coordinator	Philipp Grundmann Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB) Email: go-grass@atb-potsdam.de, pgrundmann@atb-potsdam.de
Project Duration	October 2019 – March 2024

Deliverable No.	D6.4
Dissemination level [1]	PU
Work Package	6
Task	6.3 Decision support tool for optimal and flexible integration of value chain components
Lead beneficiary	G!E
Contributing beneficiary(ies)	ATB, RISE, VMT, IFAU, OMKI, ARAD, AGACA
Due date of deliverable	29.02.2024
Actual submission date	29.02.2024

[1] PU = Public

PP = Restricted to other programme participants (including the Commission Services)

RE = Restricted to a group specified by the consortium (including the Commission Services)

CO = Confidential, only for members of the consortium (including the Commission Services)

Document history

V	Date	Beneficiary	Author/Reviewer
1	08.02.2024	G!E	Nathalie Bargues
2	12.02.2024	ESCI/ G2G	Reviewer: Natalie Höppner, Anna Paulusz
3	28.02.2024	ATB	Reviewer: Hyunjin Park, Philipp Grundmann

GO-GRASS in a nutshell

GO-GRASS project (www.go-grass.eu) aims to create new business opportunities in rural areas based on grassland and green fodder and to support their replication throughout rural communities in the EU. The project develops, deploys and validates a set of small-scale demonstration sites (DEMOs) of a circular integrated agro-food system in four EU regions (Denmark, Germany, Sweden and the Netherlands). The project is expected to develop technologies from the current Technology Readiness Level (TRL) (between 5 and 6) to more advanced ones (8) successfully implemented under real conditions at the end of the project.

The DEMO in Denmark aims to develop a small-scale bio-refining technology to extract protein concentrates for monogastric animals from grassland situated in nitrate sensitive areas. In Germany the DEMO targets to produce biochar via Hydrothermal Carbonisation of grassland-cuttings from wetlands as supplement for soil improvement. In the Netherlands it is to develop digester and fermentation technology to produce paper and carton products from a road-side grass and nature or fauna grass. In Sweden, the aim is to establish briquetting technology at local and small-scale to produce climate-friendly and heat treated animal bedding using reed canary grass. Beyond the development of the individual DEMOs, the project aims to integrate the technologies and business models across the DEMOs to create additional values and value chain nods.

In order to realize and support its objectives, the project employs the principles of cumulativeness, innovation, replicability, inclusiveness, and circularity. The principles serve as guidelines and requirements for adapting and developing various tools, integrating circular economy in rural areas, ensuring successful demo implementation, creating favourable business environments and maximising the replication potential in other rural areas in EU.

The tools to be developed by the GO-GRASS project include: online tools for business case assessment and funding; a manual on how to get started and succeed; a tool kit for cluster and network development; training courses for existing and future entrepreneurs; and guidelines on creating favourable business environments.

GO-GRASS will contribute to a range of circular and sustainable business models with high replication potential that can be used by entrepreneurs, local authorities and other stakeholders. It will demonstrate innovative cost-effective technologies, processes and tools applicable within the diverse DEMO scenarios. This will enable to effectively use grassland and shrubs which are being left to decay after mowing causing costs and lost benefits for individuals and society.

To stay up to date with GO-GRASS project events and reports, follow us on Twitter (@GoGrassEU), LinkedIn (GO-GRASS) or visit www.go-grass.eu.

Spelling Guidelines

Standardised British Spelling (NOT Oxford Spelling!) should be used in all documents. Generic terms are spelled in lower case, specific terms and proper names are spelled with initial capitals. For metric tonnes use the term "tonnes" and NOT tons.

Disclaimer

Any dissemination of results must indicate that it reflects only the author's view and that the Agency and the European Commission are not responsible for any use that may be made of the information it contains.

Table of Contents

1. Introduction

This user manual is designed to provide comprehensive guidance on navigating and utilizing the features of the GO-GRASS Online Decision Support Tool. To do, so the manual outlines the objective of the tool and the ways to access it and delves into each page of the assessment tool, offering insights into its functionalities and optimizing user interaction with the interface.

1.1 The GO-GRASS Assessment Tool

The GO-GRASS Assessment Tool serves as a platform for evaluating the feasibility of business ideas related to grass valorisation. Developed with a user-centric approach, this tool integrates real-world value chain indicators and insights from expert-based case studies. Its primary objective is to identify critical success factors and potential obstacles within user-generated scenarios, leveraging empirical data and expert knowledge.

Figure 1: Description of the Online Decision Support Tool on the official project's website (training section).

1.2 Accessing the GO-GRASS Assessment Tool

The GO-GRASS Assessment Tool is conveniently accessible through the following URL: https://www.gograss-dss.eu/.

Alternatively, users can navigate to the tool by browsing the Knowledge Centre of the official project's website and by selecting the option "Online Decision Support Tool" as illustrated in Figure 1.
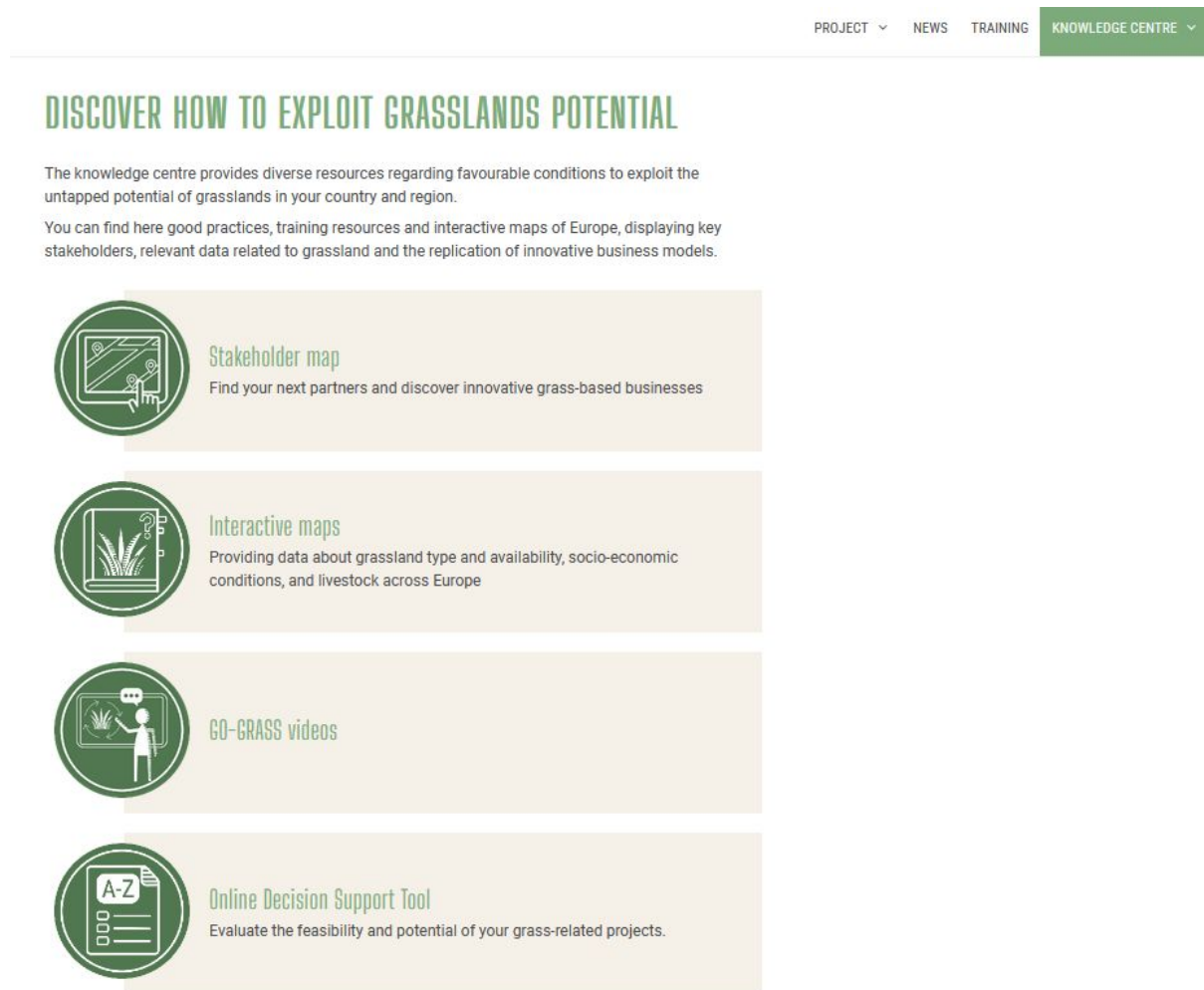

Figure 2: Accessing the Online Decision Support Tool via the official project's website (https://www.go-grass.eu/knowledge-center).

Note: Insert Figure 1 image showing the website menu with the "GO-GRASS Decision Support Tool" option highlighted.

By following these simple steps, users can seamlessly access the GO-GRASS Assessment Tool and begin exploring its functionalities to evaluate their business ideas effectively. In the

subsequent sections of this manual, we will delve deeper into the various features and capabilities of the tool to enhance your user experience and maximize its potential benefits.

2. Interacting with the GO-GRASS Decision Support Tool

An overview of each page of the tool focusing on (i) the information and content made available to the user and (ii) the actions that can be executed are presented in the following chapters.

2.1 The GO-GRASS Decision Support Tool – Landing Page

The landing page of the GO-GRASS Decision Support Tool is intentionally designed to offer users an immediate and comprehensive insight into the tool's functionality, its operational process, and the anticipated outcomes from its utilization, as depicted in the following figure:
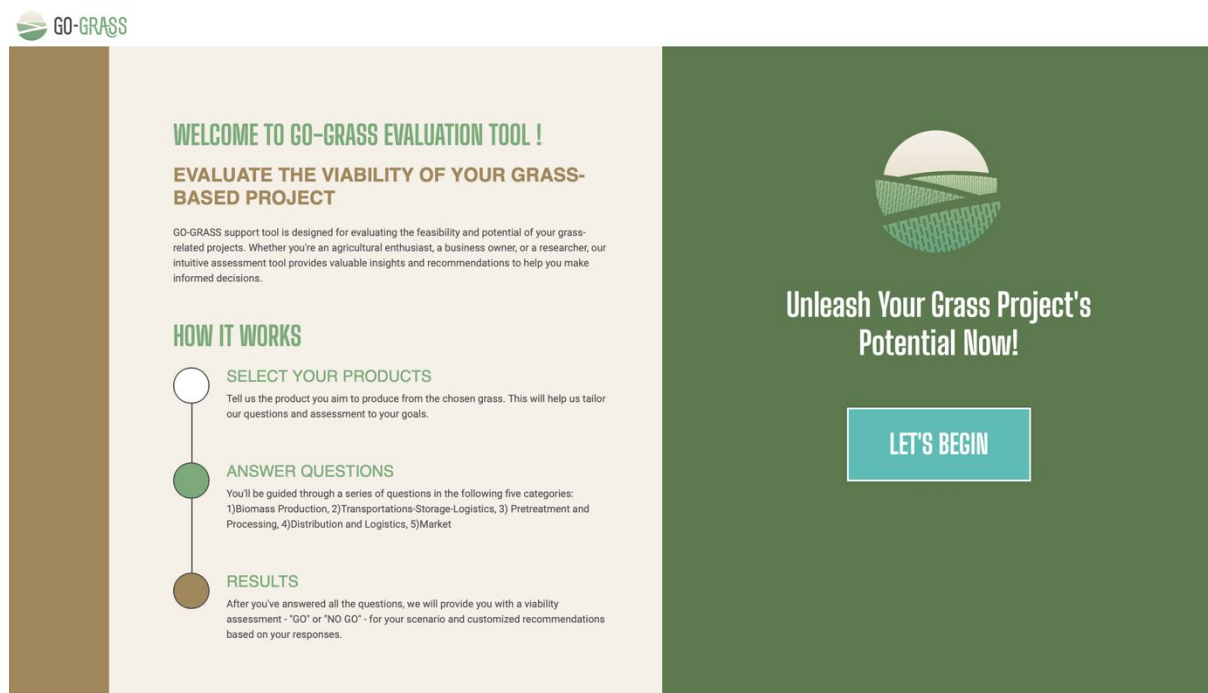

Figure 3: GO-GRASS Decision Support Tool's landing page.

The "Let's Begin" button, situated on the right side of the page as shown in Figure 3, allows users to access the tool's functionalities and initiate the questionnaire designed to evaluate the user's decision viability. The design of the GO-GRASS Decision Support Tool adheres to the project's visual identity, incorporating the logo and colour palette consistently.

2.2 The GO-GRASS Decision Support Tool – Product Selection

Upon clicking the "Let's Begin" button, the user will be prompted to select their main product from the following options: Animal bedding, Biochar, Grass Fibres for Paper, or Organic Protein, as depicted in Figure 4.
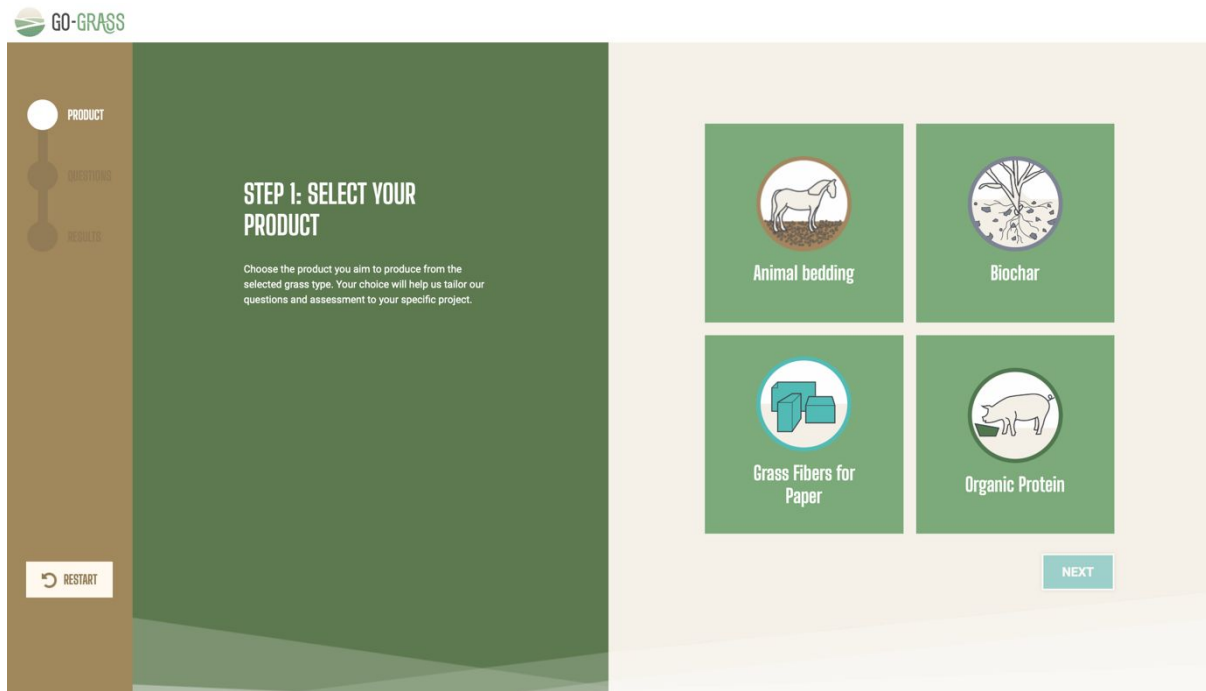

Figure 4: Main product selection.

Hovering over the available products, the user can read information about the specific product of interest for which a tailored questionnaire will follow as shown in Figure 5.
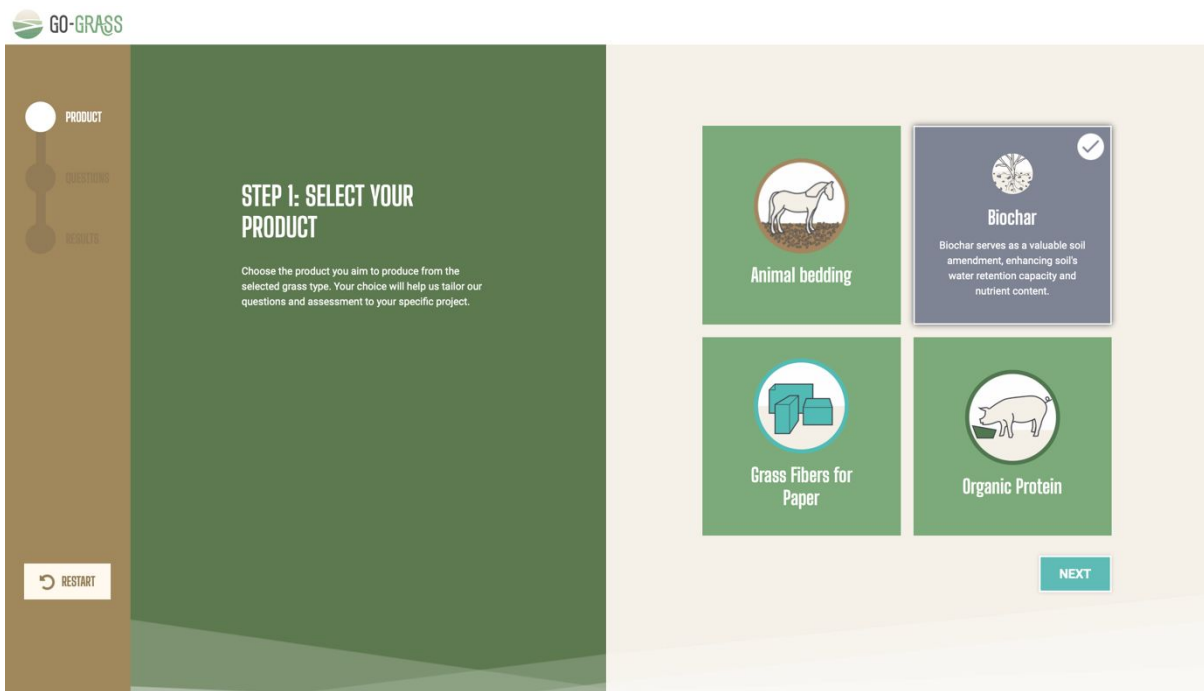
Figure 5: Main product selection and product explanation.

After selecting the main product, as a next step, the user is asked to choose the additional product (by-product) of interest. Depending on the chosen main product, different options of by-products will be displayed. Figure 6 Illustrates by-products for biochar, whereas Figure 7 is for grass fibres for paper.
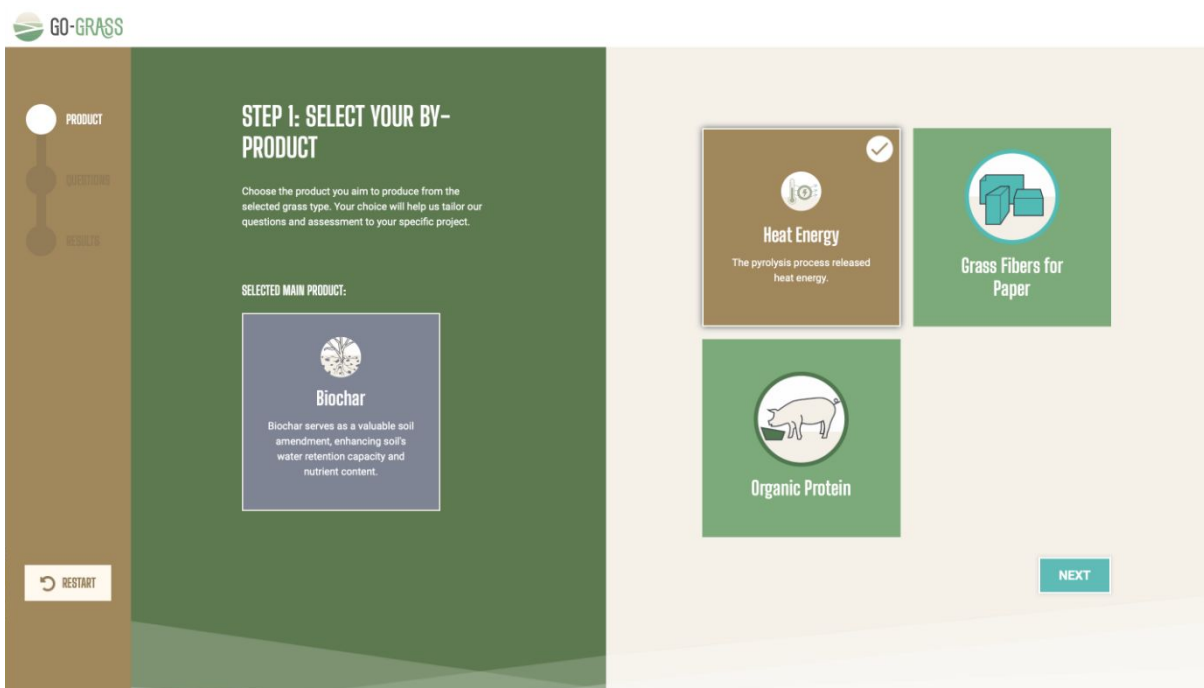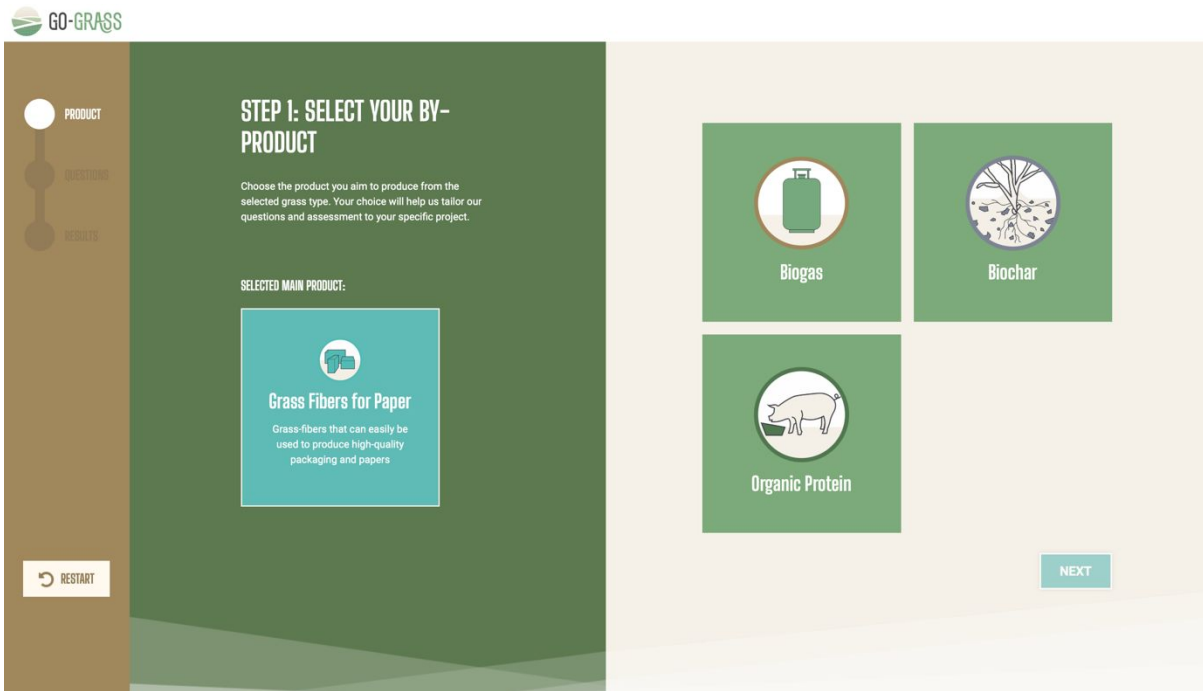

Figure 6: By-product from Biochar.

Figure 7: By-product from Grass Fibers for Paper.

2.3 The GO-GRASS Decision Support Tool – Questionnaire

Once the main product and by-product have been selected, the user can proceed to answer sets of questions tailored to match the pre-selected main product and by-product, as illustrated in Figure 8. These questions are organized into sets that correspond to different stages of commercial production:

    i.   **Biomass Production**
   ii.   **Logistics and Storage**
  iii.   **Processing**
  iv.   **Distribution**
   v.   **Market.**

The set of questions may appear in the form of either single YES/NO questions as depicted in Figure 8 but they can also appear as multiple-selection questions that the user can select checkboxes of interest as shown in Figure 10. Users can undo their selections by clicking the "↺" button positioned to the right of each question as demonstrated in e.g. Figure 8 or by clicking on the Reset all option.

Figure 8: First set of questions related to biomass production.

Figure 9: Multiple selection questions.

Users can gain further insights into the context of each specific question by clicking the information icon located to the left of each question, as illustrated in Figure 10. Furthermore, for each set of questions (e.g. under Storage & Logistics) a "Did you know" box can be found on the right side of the screen, with educational information or links redirecting the user to sites with additional information relevant to the particular set of questions.
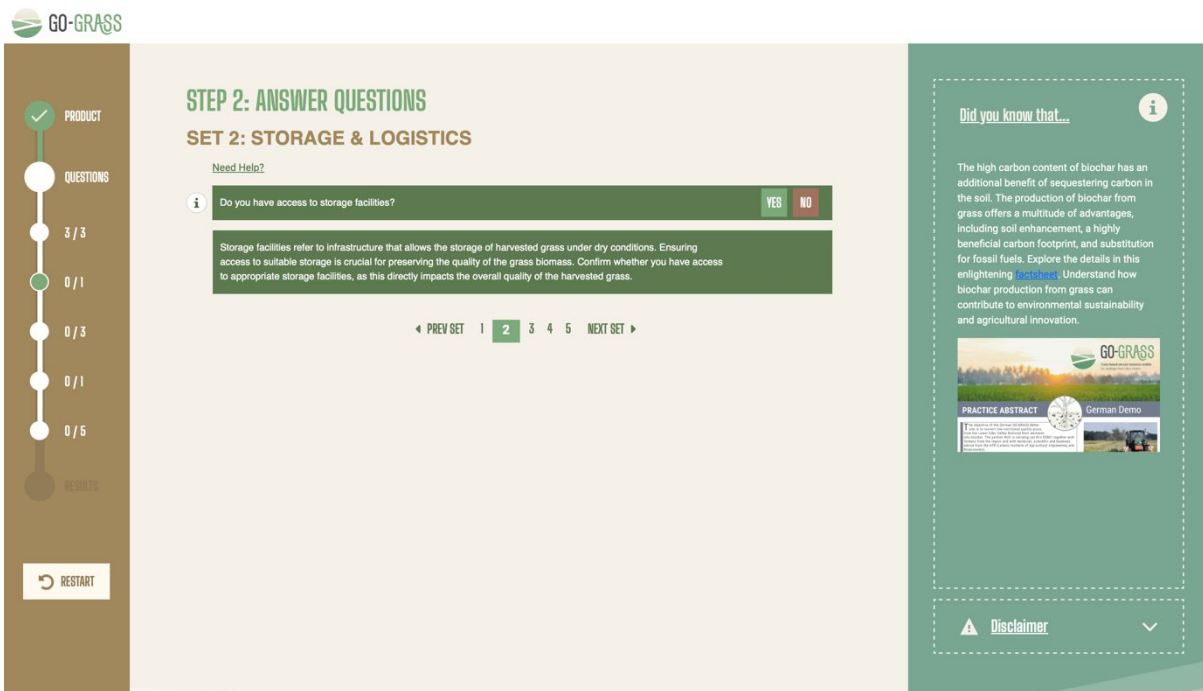
Figure 10: Elaboration on the context of a question under the section on storage and logistics.

Located in the lower-right corner of the screen is a dedicated disclaimer box containing platform-related information. Users can access and read the full text of this disclaimer by expanding the arrow within the box, at any point during their interaction with the questionnaire, ensuring transparency and accessibility as shown in Figure 11. Regardless of the user's current stage or choices, there is always the option to initiate a fresh start and make new selections by simply clicking the "RESTART" button located at the bottom left of the screen as illustrated e.g. in Figure 10.
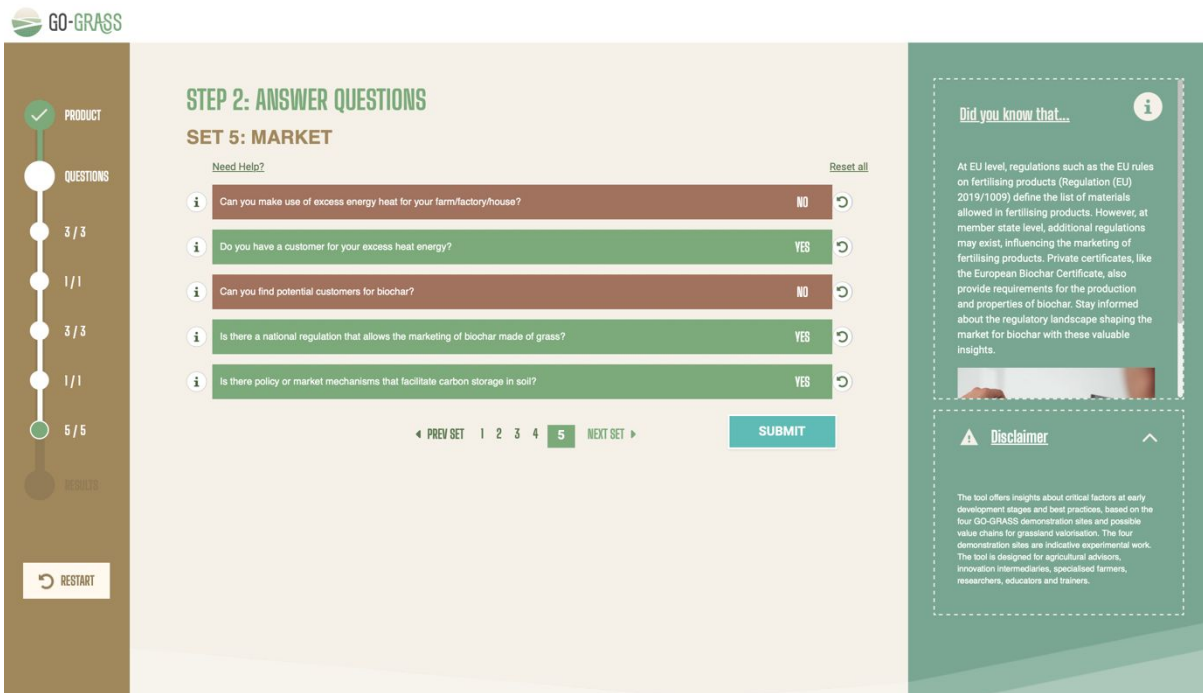
Figure 11: Disclaimer of the tool appears in all the sets of questions in the bottom right corner.

As shown in Figure 11 once the user has answered all the questions in all five sets, a SUBMIT button appears. Once clicked, a pop-up window will appear, seeking permission to guide the user to the results page. Only upon granting this permission, will the user gain access to the results and land on the results page, as illustrated in Figure 12.

Figure 12: Submitting results and going to the results page.

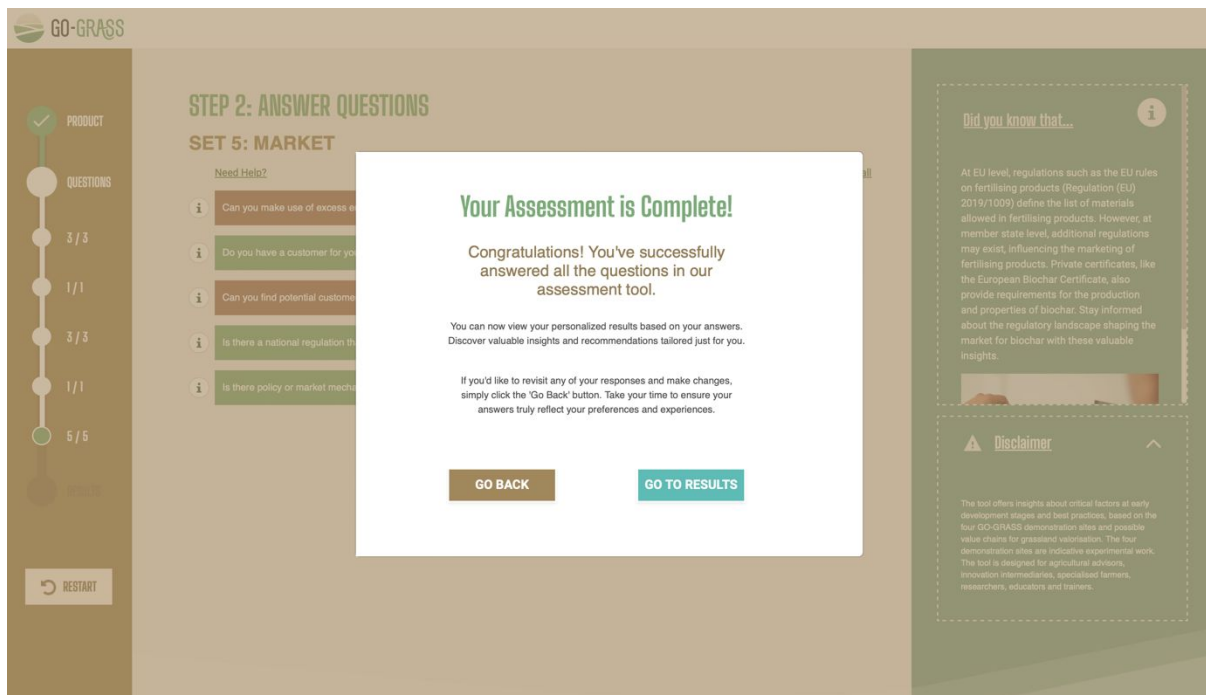## 2.4 GO-GRASS Decision Support Tool – Results

The results page is where the crucial factors of the user's scenario are displayed. Based on the user's chosen indicators, the tool offers insights into potential missing success factors, critical considerations, and additional recommendations. Users can further export this information in the form of a PDF file by simply clicking the "DOWNLOAD PDF" button located in the top right corner of the screen. As shown in the figure below, an answer that fulfills the critical requirements illustrated in green colour, whereas a mismatch with the proposed ideal answer appears in red.

Figure 13: Result page with all considerations, infographics, additional links to contact persons and publications, as well as the option to download user results.

Justification of the answers that were considered critical in the evaluation of the user's scenario appears by clicking on the + icon of each critical question as shown in Figure 14.

Figure 14: Critical considerations expanded by clicking on the + icon.

Additional information concerning a specific product and by-product selection is given on the result page, with a link redirecting to the GO-GRASS Knowledge Cloud, relevant publications, as well as, contact information of experts relevant to the scenario as shown in Figure 15.

Figure 15: Additional links and contacts for a specific user scenario.

2.5 Assessment of the User's Scenario

The final score is based on the critical considerations, through a rating *of 1-5* displayed as stars. The additional considerations provide tailored guidance to the users that will help them develop grass products and optimize their value chains.

3. GO-GRASS results and use of the tool after project end

The goal of the Online Decision Support Tool is to help users make more informed decisions about a business idea related to the processing of grass. The tool offers insights about critical factors and best practices, based on the four GO-GRASS demonstration sites and possible value chains for grassland valorisation, at an early phase of the development. The focus is on the processing, scaling up, and technologies for grass valorisation.

The critical factors represent requirements that need to be considered when assessing the potential of innovative grass-based value chains, such as the availability and access to grass and infrastructures, consumers' perceptions and capacity development.

The main target users of the tool are agricultural consultants and advisors, innovation intermediaries, specialised farmers, researchers, and trainers.

The content and structure of the tool are built on findings, data and methodologies outlined in different Work Packages, in particular WP6, WP4, and WP8.

The tool is based on experts knowledge provided in the frame of GO-GRASS. Greenovate! Europe, IFAU and ATB used knowledge obtained from "D6.1 Report on key value chain components from GO-GRASS demo cases", "D6.2 Report on flexible integration of GO-GRASS demo value chain components", "D6.3 Report on optimal scenarios for European grassland-based food systems", "D4.2 Participatory Technology Assessments", "D8.3 How to get started and succeed manual" and its checklist of key preconditions, Task 1.4 Common KPIs for circular agri-food value chains and Task 4.6 Integrated assessment. Further knowledge was integrated in the tool through direct interactions with experts and validation of the tool by experts in the project.

Besides the four demo value chains tested by the GO-GRASS partners, the tool is proposing three hypothetical value chains A, B and C, which are described in "D6.3 Report on optimal scenarios for European grassland-based food systems".

These integrated value chains are combining two grass-based products in view of optimising the demo value chains, through flexible integration of value chain components.

Main products (First screen)	Additional products (Second screen)
Grass fibres for paper	Biogas (Dutch DEMO)
	Biochar (integrated value chain C)
	Protein (integrated value chain B)
Biochar	Heat energy (German DEMO)
	Fibers for papers (integrated value chain C)
	Protein (integrated value chain A)
Protein	Biogas and grass fibres (Danish DEMO)
	Biochar (integrated value chain A)
	Grass fibres for paper (value chain B)
Animal bedding	Dust and grass fibres (Swedish DEMO)

Table 1: List of value chains used to build the seven sets of questions, adapted to the different products

After end of the project, partners will disseminate the tool on relevant channels, and make it available in repositories, bioeconomy platforms and databases of smart farming tools (such as EUFarmBook, Digital Innovation Hubs, EU CAP Network, FAIRshare inventory).

The consortium is also considering options to reuse and upscale the tool within related EU-funded projects fostering rural business models.

The tool presents the barriers and the success factors of the user's scenario. Considering the indicators selected by the user, the tool provides the success factors that might be missing, and conclusions and recommendations.

The tool will be available for GO-GRASS partners at least five years after the project ends. It will also be available as "open access" on repositories of bioeconomy and databases of smart farming tools, and be reused and up-scaled within related EU-funded projects fostering rural business models.

4.   Development of the GO-GRASS Assessment Tool

Agile development methodology was adopted for the GOGRASS Tool, enabling iterative and collaborative development processes. This approach emphasizes adaptability, frequent deliveries, and continuous improvement, allowing for flexibility in responding to changing requirements and ensuring alignment with stakeholder needs throughout the development lifecycle.

1.1. Backend Development

In web development, the backend consists of server-side components handling core logic, databases, and APIs, crucial for functionality but not visible to users. It manages data processing, storage, and security, serving as the platform's backbone.

Laravel Framework

In the scope of the GOGRASS Tool development, the Laravel framework was selected as the primary tool. Renowned for its safety, extensibility, and adherence to best coding practices, Laravel's implementation of the MVC (Model-View-Controller) architecture ensures a clear and maintainable codebase. This strategic selection of Laravel underpins the longevity and scalability of the tool.

Database

For the database component of the GOGRASS Tool, MariaDB, was selected. Its relational nature aligns with the needs of the project, as it efficiently handles structured data, ensuring data integrity and availability. Furthermore, MariaDB provides enhanced performance features (such as optimised queries and indexing), improving the user experience provided.

API Implementation

The GOGRASS Tool leverages APIs (Application Programming Interfaces) to expand its capabilities through seamless integration with external services.

1.2. Frontend Development

In web development, the frontend is what users directly interact with, encompassing design, layout, and navigation for a user-friendly experience, translating backend data into an understandable format.

Laravel Blade

Laravel offers Blade, an intuitive template engine, enabling developers to seamlessly integrate frontend with backend infrastructure. Blade templates feature a clean syntax, facilitating dynamic and reusable views, including variables, conditional statements, loops, and more, for efficient web page creation and enhanced code organization.

Bootstrap CSS

Bootstrap is the most popular CSS toolkit used in the development of web applications and sites, especially known for its responsiveness (ability to adjust to all screen sizes) capabilities and its vast library of pre-styled components. These two features made bootstrap the best frontend tool for the development of the GOGRASS Tool.

ReactJS

React, an open-source JavaScript library, employs a component-based structure for building efficient user interfaces. In the GOGRASS Tool, React was utilised to develop interactive components, including all the different steps of the tool as well as individual components for each step. Its ability to optimize user experience drove its integration into the platform.

Database Design

For data management in the GOGRASS Tool, a comprehensive set of tables and relationships was designed, illustrated in the Entity Relationships Diagram (ERD). Each table represents a distinct system entity, with additional relation tables linking these entities. The database design adheres to normalization principles, emphasizing data organization to minimize redundancy and dependency, ensuring data integrity.
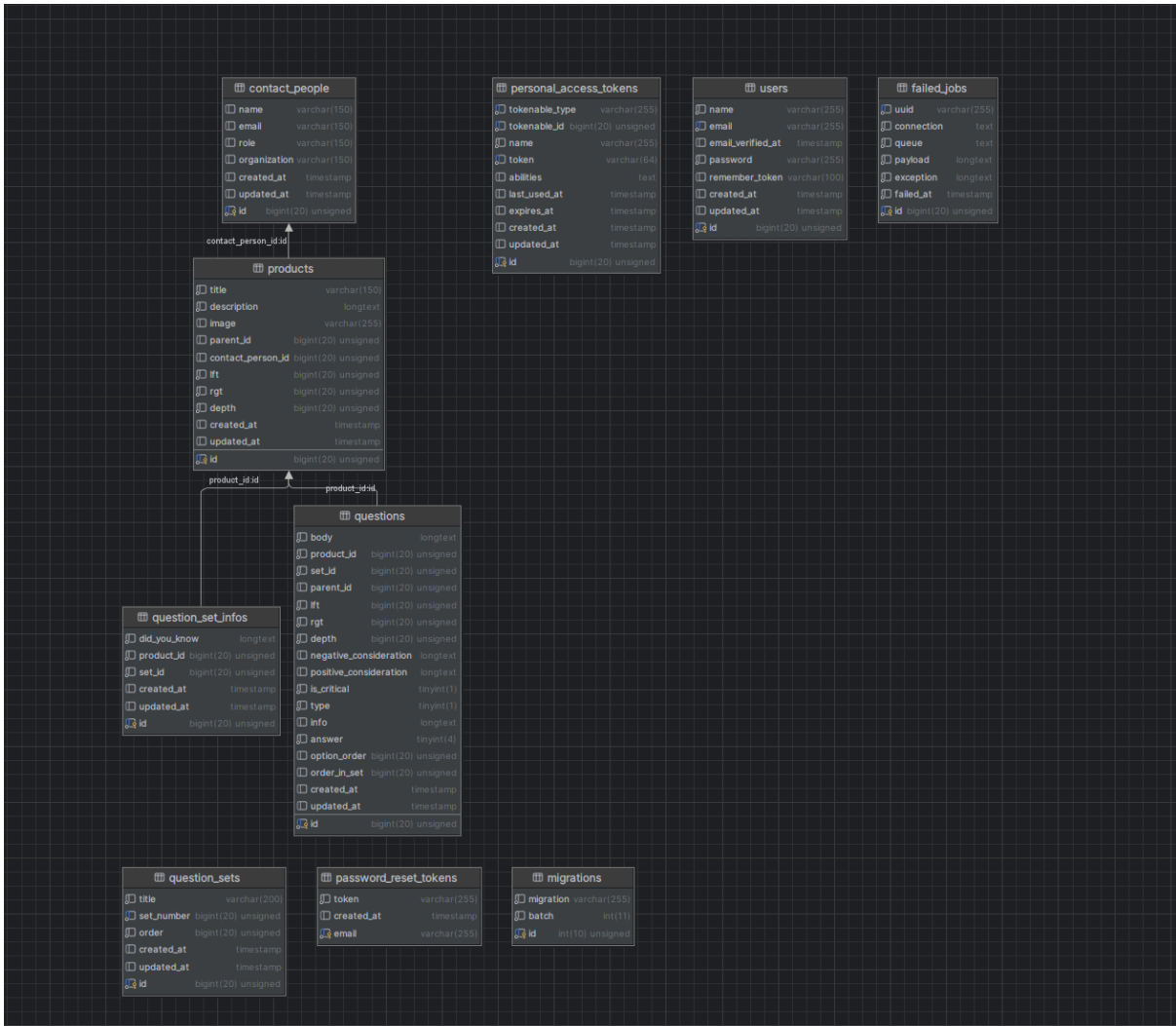
Figure 1: ERD of the GO-GRASS assessment tool.

2. GO-GRASS Assessment Tool- IP

The intellectual property (IP) and industrial property rights pertaining to the Go-Grass assessment tool are held within the purview of the Agricultural University of Athens (AUA) and the Go-Grass project. As such, these entities possess the authority to allocate them freely as they see fit. This underscores the commitment of the AUA and the Go-Grass project to foster accessibility and utilization of the assessment tool for the betterment of agricultural practices and environmental sustainability.