



# D.1.3 Risk Management and Quality Assessment Plan

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## Document sheet

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## Executive summary

This deliverable (D1.3) concerns the Quality Assurance and Risk Management plan for project "PYRAGRAF – Decentralized pyrolytic conversion of agriculture and forestry wastes towards local circular value chains and sustainability", as defined in task T1.3 of WP1 (Project coordination, management, and quality assurance). This document aims to establish guidelines to ensure the overall quality of the project and to address its risks with an adequate definition of risk ownership, risk assessment, prevention, and mitigation. It aims to achieve high quality results for the project and applies mainly to organizational and management procedures.

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# 1. Quality assurance

The purpose of quality assurance is to specify the roles and responsibilities for monitoring quality and establishing quality assurance procedures to achieve high-quality results (e.g., deliverables, dissemination activities). As such, quality assurance and control will ensure that all project results meet the planned quality standards to guarantee project execution. In practice, ensuring quality within PYRAGRAF will require: a solid management structure; careful monitoring of outputs and milestones; and dissemination of targeted communication activities and materials to the main stakeholders envisaged by the project.

## 1.1 Management structure

The consortium is composed of twenty (20) partners (13 full beneficiaries and 7 associated partners). To guarantee and fulfill the expectations and objectives of the project, effective and efficient interaction between all the partners will be necessary to avoid any management difficulties. PYRAGRAF's management structure was detailed in D1.6 "Project Management Plan" and is shown in Figure 1.

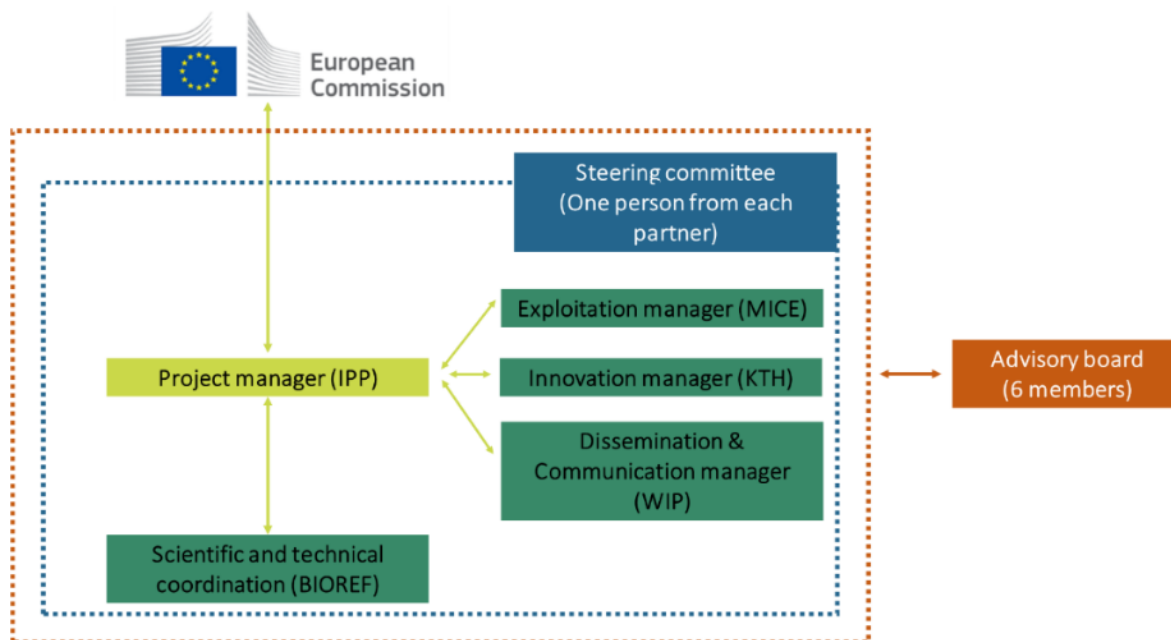


Figure 1. PYRAGRAF's management structure.

The quality assurance roles at PYRAGRAF are distributed among the management entities that compose the management structure according to their level of involvement and responsibilities. These roles are summarized below:

- **Steering committee (SC):** The SC is the body responsible for taking key decisions throughout the project's lifetime.
- **Project manager (PM):** The PM, representing the project's coordination, acts as the intermediary between all parties and the granting authority and supervises project execution and the fulfilment of its goals.
- **Scientific and technical coordinator (STC):** The STC will have the role of quality control and management in the project's technical processes.

- Innovation manager (IM): The IM will be responsible for the promotion and maintenance of the innovation of the project and will supervise aspects related to the protection of intellectual property.
- Exploitation Manager (EM): The EM will be responsible for the supervision of exploitation strategy for the final project outputs.
- Dissemination and communication manager (DCM): The DCM will oversee the execution of activities related to D&C throughout the project.,
- Work package leader (WPL): WPLs will ensure the successful execution of the activities carried out in all project tasks of their WP.
- Advisory board (AB): The AB will be composed of up to 6 members from well-recognized entities and will support the activities planned for PYRAGRAF.

## 1.2 Quality assurance and control

### 1.2.1 Meetings

In PYRAGRAF, quality assurance will be guaranteed by holding regular meetings followed by minutes detailing the action points. The consortium partners meet regularly via online conferencing tools (Microsoft Teams, Zoom or Google Meet). The different types of meetings were previously detailed in deliverable D1.6.

Consortium meetings will be held twice a year, preferably face-to-face, each in the country of a beneficiary, and a maximum of two representatives from each beneficiary must be present. These meetings are structured thematically to address the key points in the PYRAGRAF project and what needs to be done in the following months. Steering Committee meetings will be held 4 times a year via MS Teams to assess progress from the project's global perspective. Technical meetings between WPLs and the partners working on each WP will take place via MS Teams or in the context of a technical visit between partners. These meetings can be periodic or on an as-needed basis and must be duly communicated to the PM.

### 1.2.2 Overall documentation

The templates, which correspond to each type of document that is expected to circulate in the PYRAGRAF project, are available in the project's internal communication platforms (Microsoft Teams and SharePoint).

### 1.2.3 Deliverables

Deliverables are documents that detail the important results of the project. These documents are created throughout the project to provide the necessary results and impacts. PYRAGRAF has a total of 39 deliverables, of which 8 are due by M12, 8 by M24, 6 up to M36 and 17 up to M48. Table 1 shows the expected deliverables up to M12.

Table 1. PYRAGRAF's list of deliverables up to M12.

Number	Title	WP	BEN	Due date - type
D1.2	Data Management Plan	1	IPP	M6 - PU
D1.3	Risk Management and Quality Assessment Plan Innovation	1	IPP	M6 - PU
D1.4	Landscape Scenario & Strategy Plan	1	KTH	M12 - PU
D1.6	Project Management Plan	1	IPP	M2 - PU
D2.1	Report on the characterization of local feedstocks	2	TUBITAK	M8 - SEN
D2.2	Report on the development of smart and innovative screw conveyor biomass dryer	2	TUBITAK	M12 - SEN
D7.1	Communication and dissemination plan	7	WIP	M6 - PU
D7.2	Definition of project branding	7	WIP	M6 - PU

#### 1.2.4 Milestones

Milestones are necessary as it is necessary to analyze the progress of all the tasks that have been agreed to ensure that the work is on track and that the results achieved so far correspond to what is expected in terms of quality. If necessary, any changes or deviations will have to be requested from the PO. More details about the milestones are shown in D1.6. Table 2 shows the expected milestones up to M12.

Table 2. PYRAGRAF's list of milestones up to M12.

Number	Title	WP	BEN	Due date
1	Definition of feasible feedstock supply chains (two per each country), used to feed and test the PYRAGRAF concept	2	TUBITAK	M8
2	Obtention of the optimal parameters for the smart and innovative screw conveyor biomass dryer	2	TUBITAK	M12

#### 1.2.5 Dissemination and communication materials and activities

Dissemination activities are generally overseen by the DCM, which can also be consulted on how to successfully disseminate project results. Dissemination of project results is an important step in making the project known and the results available to project stakeholders and a wider public. A basic form of dissemination is the appropriate placement of logos and



a clear textual reference to the project funding. Unless otherwise agreed with the EC or in case of impossibility, any dissemination of project results must display the EU emblem and contain the following text in accordance with Article 29.4: "This project has received funding from European Union's Horizon Europe research and innovation programme under grant agreement no. 101114608". The project logo must be included in a visible way.

## 2. Risk management

Recognizing and identifying risks is considered a crucial part of project management to anticipate situations that may affect the normal progress and completion of the project. All problems/risks will be solved by exploiting the accumulated experience of the partners in the execution of the project and by applying a well-defined management scheme.

Risk management is a continuous process throughout the project and makes it possible to identify, quantify, manage, and monitor any difficulties that may arise. Risk management is divided into five stages: (a) identification and assessment, (b) response, (c) monitoring, control, and communication.

### 2.1 Risk assessment

Table 3 shows the critical risks identified in PYRAGRAF.

Table 3. PYRAGRAF's critical risks.

Number	Risk	WP	Mitigation
1	Poor data to support the residual feedstock supply chains	WP2	Strong interaction between the consortium partners, who cover all stages of the supply chain, thus being very experienced in their domain. The supply chains will be built and discussed during online meetings. If data is not adequate, literature data will be recalled
2	Poor yields in the field trials	WP4	Field trials are a form of embedded investigation to assess alternative practices and are particularly appropriate for diverse or understudied complex agricultural systems. This approach can be used to both estimate the robustness of a practice and test assumptions of how the system works.
3	Advanced predictive models fail to satisfactorily predict process performance	WP3	Proven rate-based and simple empirical models as well as experimental evidence will be used for process simulations and scale-up studies.
4	Overall energy, environmental, economic, and risk- based performance below target	WP3	Identify criticalities, suggest areas of process and material development, modify the integration in the full-scale plant.
5	Thermal integration between different modules does not perform accordingly	WP3	Provide thermal requirements from other alternative sources (e.g., increase in syngas combustion).
6	Process steps engineered or delivered by different partners do not perform together	WP3	Early and clear definition of technical interfaces and specs. of minimum gas qualities, operation conditions, etc.
7	Poor performance of catalysts	WP5	Mostly proven commercial materials will be used except for some catalysts for tar reforming; Early measurements of impurities in the pyrolysis vapors; Identify protection measures to avoid catalyst poisoning, whenever relevant.
8	Feedstock heterogeneity will challenge the interpretation of results	All	Analysis on a regular basis to map heterogeneities between different batches of feedstock; Blended feedstock can also be used.

9	Poor experimental performance or unsuccessful process validation at TRL 6 and TRL 7	WP3, WP4	Important long-term experience with the specific process steps available; Identify bottlenecks of the combined process chain, suggest process changes, and apply the economically most viable measure ensuring best performance.
10	Mathematical models become too large and not possible to solve considering variations and multi-objectives	WP3	Use alternative and hybrid modelling approaches such as simulation and optimization or robust optimization; Run the models for different areas separately
11	Leak of flammable liquids or gases	WP5, WP3, WP2	Detailed safety analysis (e.g., hazard and operational (HAZOP) analysis); Safety protocols followed for all units; Clear training and standard operating procedures (SOP) established for all units and personnel; Hazardous gas sensors and alarms installed
12	Incidents during the experimentation, including the leak of flammable liquids or gases	WP5, WP3, WP2	Each partner of the consortium has strict internal safety measures including detailed HAZOP analysis which will minimize the likelihood and impact of such events. Possible rescheduling of activities and possible amendment to EC for project extension
13	Injuries during experiments	WP5, WP3, WP2, WP4	Each partner of the consortium has strict internal safety measures including detailed HAZOP analysis which will minimize the likelihood and impact of such events. Possible rescheduling of activities and possible amendment to EC for project extension.
14	Major delay of critical activities	All	Rescheduling of activities handled by the project's SC and PM; Possible amendment for project extension.
15	Increased costs concerning planned activities	All	Failing partner will have to justify the reason for exceeded expenses; Verify the possibility of co-funding by the interested partner; Consider reduction of the remaining activities focusing on the most important ones.
16	Difficulty to engage a significant number of end- users for industrial uptake and increased impact	WP5, WP7	Several end-users already committed (associated partners). Additional ones reached via events/dissemination (WP5); Techniques showcasing (WP3) shall attract potential users.
17	Gender balance and/or any other kind of discrimination	All	It will be ensured that all project partners follow best practices in job offers, personnel contracting, and labor conditions. A status check for GEP during the project will be issued.

18	Technology R&D does not reach sufficient quality or certainty to allow for proper LCA/LCC	WP6	Auxiliary procedure for data review and methodology for filling data gaps is already available and may be used if needed.
19	The business and production process will be poorly defined to allow to use BPMN 2.0. standard	WP6	Involving personnel performing analyses based on the BPMN 2.0. standard in the entire process of technology demonstration.
20	Intellectual property right conflicts and/or new relevant issues	WP5	CA will be clear about strategy and golden rules on intellectual property right; Intellectual property right will be monitored and updated throughout the whole project, with the participation of all partners involved.
21	Breach by a partner of its obligations GA/CA	WP6	Transparent project management will be always issued; Replacement of expertise possible by other partners; CA will be well devised and negotiated firsthand.
22	Consortium partners underperform in tasks (lack of quality/relevance in the produced outputs) and/or fail to deliver or deliver on time	WP6	The PC will ensure proper interaction and enforce deadlines; All partners will be made aware of success metrics; Regular quality checks on tasks and deliverables progress will be conducted, together with the regular Steering Committee meetings.
23	Exit of a partner for diverse possible reasons	WP6	Replacement is easy to find/cover within the consortium, given the likely overlap of competencies and/or facilities; Great set of associated partners also in; Past experience in managing replacements and amendments will make any eventual need run smoothly and faster.
24	Insufficient financial resources	WP6	Well-balanced budget approved in pre-meetings.

## 2.2 Response strategy

The risk response strategy details the procedures for identifying and monitoring risks, describing the actions required to prepare and implement an appropriate contingency plan. Both the list of risks and the contingency plan will be regularly reviewed and updated during the project, when necessary. The appropriate mitigation measures for each anticipated risk have been presented in Table 3.

Given the collaborative nature of PYRAGRAF, well-defined responsibilities are required for the risks identified and new ones that may arise. Although this document is part of WP1 T1.3, all partners must manage the project activities so that they can be completed successfully. In PYRAGRAF, the Management Team (MT) will be responsible for the risk management process, ensuring the monitoring and control of risks throughout the project, with the support of the PM. The WPLs will be responsible for implementing the work under their own WP and are therefore responsible for the risks relating to the deliverables and milestones under their corresponding WP. They will ensure the identification and management of risks and should inform the MT about the status of risks. In situations where several work packages are involved, the WPLs will share responsibility for the risks. If new risks are identified, they must be reported on the Risk Management Database (RMD) and declared to the MT. The RMD is an interactive excel file, where all current risks, responsibilities and mitigation measures are described. The document has a “read me” section with instructions for use, and a spreadsheet specifically to add new risks and corresponding solutions. The regular review and updating of this document are the responsibility of the MT, and this document can and should be used by all partners. The RMD is located on the project’s MS Sharepoint on folder “1. Admin”.

## 2.3 Monitoring, controlling and reporting

It is the responsibility of all PYRAGRAF project partners to communicate to the MT the status of each risk, the corresponding mitigation measure, and its effectiveness, and to update the RMD. The risk responsible will also monitor the situation and inform the MT. New risks that may be identified by a partner will be analyzed against the original risk list and added to the RMD. A risk will be considered closed when the adverse situation has occurred, and it can no longer be considered a threat to the project.

This plan will be periodically reviewed and updated throughout the duration of the project, by applying it and collecting feedback from all partners, to keep activities running with minimal risk of failure and with high quality data and overall results. Although it is impossible to anticipate all risks, it remains realistic and justified for the consortium to define processes and safeguards against events that could negatively affect the project.