



# Root2Res

Root phenotyping and genetic improvement for rotational crops resilient to environmental change

## Quality Management Plan

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The Quality Management Plan defines the quality assurance and quality control policy measures to be applied in the Root2Res project. Its purpose is to describe the principles, roles, procedures, indicators, and tools necessary to ensure that the Root2Res project is implemented efficiently and that all project outputs and deliverables are submitted on time, meeting high quality standards. The potential Quality Management issues will be monitored by the project Coordinators and Executive Committee and discussed regularly at project meetings. It will be updated in the course of the project when necessary.

Deliverable Number	Work Package / Task
D8.2	WP8 / T8.2
Lead Beneficiary	Deliverable Author (S)
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Beneficiaries	Deliverable Co-Author (S)
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Planned Delivery Date	Actual Delivery Date
28/02/2023	28/02/2023

Type of deliverable	R	Document, report	<input checked="" type="checkbox"/>
	DEM	Demonstrator, pilot, prototype, plan designs	<input type="checkbox"/>
	DEC	Websites, patents filing, press & media actions, videos, etc.	<input type="checkbox"/>
	DATA	Data sets, microdata, etc.	<input type="checkbox"/>
	OTHER	Software, technical diagram, algorithms, models, etc.	<input type="checkbox"/>

Dissemination level	PU	Public, fully open, e.g., web	<input checked="" type="checkbox"/>
	SEN	Sensitive, limited under the conditions of the Grant Agreement	<input type="checkbox"/>

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## 1. Introduction

The scope of the Root2Res Quality Management Plan is to set up quality assurance and quality control processes and provide guidelines for their implementation by all Root2Res partners. In particular, this plan aims to define the Project organization, procedures, roles and responsibilities related to the quality management that will be carried out, and to describe how the Project quality standards will be met and controlled.

The specific objectives of this deliverable are to:

- define quality standards to be met by all Root2Res activities and deliverables;
- define clear roles and responsibilities of all partners in the Quality management of the project;
- describe the operating process to ensure that the project deliverables and activities meet the quality standards expected;
- present the internal communication channels and process which will ensure the efficient sharing and reporting of relevant information related to quality assurance and quality control;
- analyse all potential risks for the project and proactively define risk mitigation measures to guarantee seamless and proper execution of the project's activities and deliverables.

## 2. Quality Management Plan

### 2.1. Quality management objectives

Quality management planning determines policies and procedures relevant to the implementation of Root2Res activities for both project deliverables and processes. These are based on a number of objectives that can be described as SMART (Specific, Measurable, Assignable, Realistic and Time-related).

#### 2.1.1. Deliverables and outputs

Specific quality management objectives related to deliverables and outputs should be as follows:

- meet the expectations of the stakeholders and European Commission, both in terms of format and contents;
- easy to understand and to use, being as practice-oriented and consistent as possible;
- high scientific added value and robustness;
- suitable for online delivery and broad dissemination activities (for Public deliverables only);
- cost and labour effective.

### 2.1.2. Quality assurance and control processes

Specific quality management objectives related to quality assurance and control processes should:

- respect the governance and project management organisation;
- respect all the start and delivery deadlines;
- respect the quality assurance and control processes;
- respect the project monitoring process;
- integrate the risk analysis & mitigation measures.

## 2.2. Project Management governance

Root2Res includes 22 partners from 13 different countries: 19 Member States, 2 Associate Countries (UK and Switzerland) and 2 third countries (Morocco with head office in Lebanon & South Africa).

A specific project management structure has been set up to ensure effective decision-making, at both strategic and operational levels. As stated in the Root2Res Consortium Agreement, it comprises the following Consortium Bodies:

- The **Coordinator** is the legal entity acting as the intermediary between the partners and the European Commission. In particular, the Coordinator is responsible for monitoring compliance by all partners with their obligations and commitments under the Root2Res Grant Agreement & Consortium Agreement. The Coordinator works in close collaboration with the Deputy Coordinator to achieve these responsibilities.
- The **Project Management Team** provides support to the Coordinator and the Deputy Coordinator in their daily responsibilities. The Project Management Team is also in charge of designing and implementing the internal workspace, organising meetings, managing the administrative work, collating partner reports, including financial reports. The Project Management Team is also involved in monitoring progress and risks related to Root2Res and report regularly to the Coordinator.
- The **General Assembly** is the ultimate decision-making body of the consortium. It includes one representative of each partner organisation and is free to act on its own initiative to formulate proposals and take decisions in accordance with the procedures set out in the Consortium Agreement and described in section 2.3.
- The **Executive Committee** is the supervisory body for the implementation of the Root2Res activities. It reports to and is accountable to the General Assembly. It is composed of the Coordinator, Project management team, all WP Leaders and co-Leaders, and all crop Leaders.

- The **Work Package Leaders and Co-Leaders** are responsible for the oversight and delivery of their respective Work Package activities.
- The **Crop Leaders** ensure that all relevant resources for a specific crop are available to and considered by WP leaders in delivery of their research objectives.

In addition, two external Expert Advisory Boards, namely the **Scientific Advisory Board** (SCAB) and **Stakeholder Advisory Board** (STAB), have been appointed to help steer and guide project activities. In particular, the SCAB assists the Executive Committee in the evaluation of the scientific program of the Project. On the other hand, STAB will support all partners to better understand the needs, the socio-economic framework and regulatory issues influencing the research topics addressed by Root2Res.

An overview of project management governance is summarized in Figure 1.

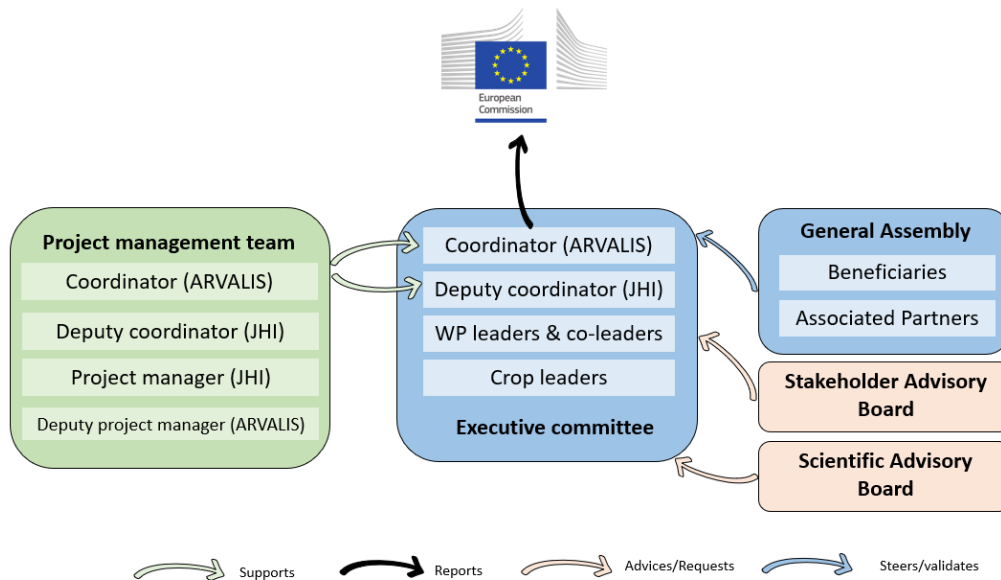


Figure 1. Root2Res' project governance structure

## 2.3. Quality management processes

### 2.3.1. Decision-making mechanisms

Using the Project Management structures defined above, we have agreed on a decision-making system to ensure that the workplan defined in the Grant Agreement (or Description of Action) is implemented in a timely manner and monitored on a regular basis. It also enables us to quickly identify potential issues and initiate corrective measures as they arise.

Different mechanisms have been implemented in terms of decision making based on the impact of a decision on the project (Table 1). But as a general rule, Root2Res will

typically try to make judgments through informal means and common sense. Voting and other formal procedures will only be used when strictly necessary and will follow the process described in the Consortium Agreement.

Table 1. The different mechanism implemented in terms of decision making.

Type of decision	Decision-taking level	Decision mechanism
<b>Minor impact</b> (e.g., technical difficulties susceptible to impact the workplan)	WP	Verbal consensus through email and specific meetings
<b>Medium impact</b> (e.g., difficulties leading to adjustments in several work packages)	Executive Committee	Verbal consensus or vote (if no consensus is obtained), to be discussed during Executive Committee meetings
<b>Major impact</b> (e.g., partner withdrawal from the project, expected delay in submitting contractual commitments)	General Assembly	Mandatory voting at the end of General Assembly

### 2.3.2. Conflict Management

The identification of conflicts during the project implementation in a timely manner is the responsibility of all Partners. The Consortium Agreement frames in detail the conflict resolution procedure. The main guidelines are summarised below.

- Partners should notify any sign of disagreement to the WP leader, or Coordinator and Deputy Coordinator (depending on the conflict);
- The Coordinator and Deputy Coordinator will be assigned as mediators to any conflicts. They will privately contact all involved partners to clarify their viewpoints and propose a conflict resolution solution.
- If no agreement is achieved after this mediation, the Executive Committee must gather to discuss and vote the measures to be taken for resolving the conflict (decision by simple majority, at a special meeting if necessary).
- If the Executive Committee fails to reach a resolution, the issue will be taken up by the General Assembly at a special meeting where the partner representatives must vote on the matter (decision by simple majority).
- The Coordinator must act according to the majority vote decision on the Executive Committee and/or General Assembly.
- Conflict resolution measure must not contradict the Grant agreement, Consortium Agreement and/or any national and European regulations.
- If the issue reaches the Executive Committee or General Assembly, all discussions and decisions must be documented.
- All partners will use good sense and good-will to avoid any conflicts and to resolve any disagreements in an amicable way that preserves the Project good collaboration.

### 2.3.3. Internal communication

Effective channels, processes, and activities for internal communication have already been established since Month 1 of the project, to allow for effective coordination, smooth cooperation and efficient exchange of all information necessary for the project implementation.

#### Physical Meetings

Physical meetings, will be held mainly as part of Executive meetings organised during each Annual meeting to ensure that all project activities and commitments are understood, monitored, and implemented as planned. The Project Management Team is responsible for the organisation of the agenda and minutes of the meetings. In case of an emergency or in need of a conflict resolution, ad-hoc meetings may be organised upon decision of the coordinator.

Proposed dates of every meeting will be discussed during remote meetings and decided over electronic polls organized by the Project Management Team, at least 3 months before a physical meeting, unless urgent need for an extraordinary physical meeting.

Minutes of each meeting will be drafted by the Project Management Team and shared with the participants within 7 days after the meeting.

#### Remote Meetings

Remote meetings (via Microsoft Teams or Zoom or other equivalent technologies) will be employed for the effective communication among project partners during the project lifetime. Every 3 months, Executive Committee online meetings will be held to monitor the progress of activities in each WP and resolve any issue that could arise.

In-between, WP leaders are in charge of organizing as many online meetings as necessary to ensure the qualitative execution of all planned tasks, milestones and deliverables.

#### Communication tools & channels

Partners rely on a common strategy for internal communication as well as for communicating Root2Res activities to ensure project outcomes are widely distributed to guarantee the sustainable use of results. A Communication handbook with tailor-made communication guidelines for partners has been prepared and included in D7.2. It includes all graphic elements such as high-definition logo, images, and templates for any presentation, milestone, deliverable and Root2Res report. The aim is to provide consistent visual branding to partners communicating their results outside the project.

In addition, a specific workspace (D8.1) has been created to enable secure, structured, and real-time internal communication and collaboration among Root2Res partners. The workspace has also been designed to digitally store, schedule, secure and monitor the consortium activities, documents, and progress (including milestones and deliverables).



Partners have also been encouraged to use complementary tools and means to promote effective communication and knowledge sharing, including emails, phone calls, video-conferencing, websites, social media accounts etc.

## Data Management

Regarding the management of data, a first version of the Data Management Plan (DMP) has been prepared, which includes a description of all Root2Res research data and its flow, how they are documented and stored, who data is accessible to, and how data is shared and preserved for re-use, following the FAIR principles (Findable, Accessible, Interoperable, Reusable) (D8.3). The DMP will evolve as a 'living document' during the project term via constant review, and updating in Periodic Reports. Co-design of the DMP will be overseen by the Executive Committee to ensure full compliance with the 'Open Data' (Directive (EU) 2019/1024), and Open Research Data initiatives.

### 2.3.4. Internal reporting

For internal project management and monitoring purposes, WP Leaders and co-Leaders will be responsible for monitoring the operational progress of the activities planned in the project and report those to the ExCOM at every ExCOM meetings.

In addition, all Root2Res partners will send a budget update in terms of human resources and expenditures to the Project Management Team every 12 months. These records will be in writing and approved by the persons working on the action and their supervisors.

The cross-analysis of this information will allow the Coordinator, Deputy Coordinator and Project Management Team to identify any possible technical or budgetary problems in relation to the commitments made by each partner and at the Project level as early as possible.

Moreover, as agreed in Article 21.1 of the Grant Agreement, a continuous reporting tool will be made available on the project workspace in order for Partners to track all sub-contracting, travel, and other direct costs spent in the framework of the project. The Project Management Team will also circulate an Excel spreadsheet to anticipate and facilitate the official report with the aim of gathering all information 2 months before the deadline of each reporting periods (M18, M36, M60).

### 2.3.5. Project official reports

According to Article 4.2 of the Grant Agreement, the project is divided into the 3 reporting periods (RPs) (Table 2).

Table 2. Summary of the Reporting Periods (RP) in Root2Res.

RP	Period in Project Month	Period in Dates
<b>RP1</b>	Month 1 - Month 18	September 1 <sup>st</sup> 2022 – February 29 <sup>th</sup> 2024
<b>RP2</b>	Month 19 - Month 36	March 1 <sup>st</sup> 2024 – August 31 <sup>st</sup> 2025
<b>RP3</b>	Month 37 - Month 60	September 1 <sup>st</sup> 2025 – August 31 <sup>st</sup> 2027

Article 21.2 of the Grant Agreement describes in detail the content of the periodic reports covering RP1 and RP2, and the final report covering RP3.

### Periodic reports

Each periodic report is composed of the technical and financial reports of the corresponding reporting period and will contain the following elements:

- a technical report, which will include:
  - a description and justification of the work carried out by the partners;
  - an overview of the progress achieved to date to meet the objectives of the action, including milestones and deliverables; and,
  - a summary for publication by the European Commission.
- a financial report, which will include:
  - a financial statement for each beneficiary for the reporting period concerned; and,
  - a justification of the use of sub-contracting, travel, and other direct costs spent in the framework of the project for each beneficiary for the reporting period concerned.

### Final report

The final report contains information related to the whole project period and will follow the reporting template provided by the European Commission. In brief, the final report must include the following:

- a technical report with a summary for publication containing:
  - an overview of the results and summary of the exploitation and dissemination activities;
  - the conclusions on the action with regards with the project objectives; and
  - the socio-economic impact of the action.
- a financial report containing:
  - the final financial statements including the request for payment of the balance; and
  - a certificate on the financial statements if necessary.

The process to ensure high quality in the delivery of the official reports involves the following steps (Table 3).

Table 3. Process to ensure high quality in the delivery of the official reports.

When	Who	What	Recipient
<b>1 month before the end of the reporting period</b>	Project Management Team	Asks the consortium partners to insert information in the periodic report template (Part A and Part B) within 1 month.	All consortium partners
<b>At the end of the reporting period</b>	All consortium partners	Provide their technical inputs, filling in the template (Part A and Part B)	Coordinator & Deputy Coordinator
<b>3 weeks after the end of the reporting period</b>	Coordinator	Synthesises and shares the draft periodic report for internal review	Deputy Coordinator, Project Management Team, WP leaders
<b>6 weeks after the end of the reporting period</b>	Coordinator	Shares reviewed version with partners and asks that remaining concerns be addressed within one week.	All consortium partners
<b>6 weeks after the end of the reporting period</b>	All consortium partners	Submit their financial statements on the EU portal	Coordinator & Project Management Team
<b>7 weeks after the end of the reporting period</b>	All consortium partners	Provide their final inputs/ modifications, if any, in respect to comments raised	Coordinator & Deputy Coordinator
<b>8 weeks after the end of the reporting period</b>	Coordinator	Finalises the report and submits to the European Commission	European Commission

### 3. Quality assessment and control

#### 3.1. Assessment and control framework

##### Milestones and Deliverables

Each project milestone and deliverable will be quality-assessed and controlled following a formal procedure (Table 4). Each partner will produce results, milestones, deliverables, or any other outputs with the highest possible quality. To ensure these high-quality standards, the partners are automatically notified of the delivery deadline 2 months before, thanks to the Planner Tool implemented on the project workspace (see D8.1). Each WP leader must ensure that he/she receives the required inputs early enough before the deadline to make an in-depth review and send to the Project Manager a proofread version 1 month before due date. The Project Management

Team are then responsible for the final quality validation and on-time submission/publication of the outputs.

Table 4. Process to ensure high quality in the delivery of milestones and deliverables.

When	Who	What	Recipient
<b>2 month before the due date</b>	Project Manager	Asks the WP Lead to consult with the Lead author of the deliverable/milestone and requests that the first draft if sent 1 month the due date.	WP Leads
<b>1 month before the due date</b>	WP Leads	Send draft of the report	Coordinator & Deputy Coordinator & Project Manager
<b>2 weeks before the due date</b>	Project Manager	Authors are given the opportunity to address comments, questions raised by the Project Management Team	WP Leads
<b>1 week before the due date</b>	Project Manager	Finalise the report and submits to the EU	European Commission

### Dissemination materials

A specific procedure has been set up for dissemination materials to ensure they are tailored to the target audience. Hence prior to any outputs being widely disseminated, they will be reviewed and validated as follow:

- **General presentation of the project** (without results), including press release: first reviewed by WP7 lead and co-lead and then validated by the Coordinator, Deputy Coordinator and Project Management team.
- **Dissemination not including results in online channels** (e.g., Twitter, LinkedIn, websites): fully managed by WP7 lead and co-lead. Each partner will also be made aware of good practices, which will allow them to make full use of social media channels themselves.
- **Dissemination including results:** to be submitted for review to the ExCom and partners not involved in the ExCom, in accordance with the procedure stated in article 8.2 of the consortium agreement. The review process is managed by WP7. And then finally validated by the Coordinator, Deputy Coordinator and Project Management team.

### Quality criteria

The quality of the project outputs will be assessed against specific quality criteria to ensure uniformity and consistency in the review process and that the reviewers' have a clear understanding of and compliance with the process. The criteria, along with the aspects to be investigated, are outlined in Table 5.

Table 5. Quality criteria used to ensure uniformity and consistency in the review process.

Quality criteria	Description
<b>Clarity</b>	<ul style="list-style-type: none"> <li>The text is clear (proper sentence structure is used).</li> <li>The text is in English (UK) or most appropriate language for the target audience.</li> <li>The text/content is unambiguous.</li> <li>The terminology, including acronyms, is explained.</li> <li>There are no spelling errors.</li> <li>Any potentially sensitive information is appropriately worded.</li> </ul>
<b>Completeness</b>	For official reports such as deliverables, all commitments taken in the Grant Agreement are fully addressed.
<b>Accuracy</b>	All factual information is supported by the respective references.
<b>Added value</b>	Each aspect of the publication, milestone, deliverable is analysed in adequate detail.
<b>Relevance</b>	The content and formats are relevant to the targeted readers/audience.
<b>Compliance</b>	The publications, milestones, deliverables comply with the official and project's templates.

### Quality control through monitoring indicators

The Project Management Team has set up a quality control procedure based on the recording of a number of indicators summarised in Table 6. These are performance targets that guarantee a high level of quality for all outputs, monitoring and management of the project.

Table 6. List of Performance Indicators to be used in the quality control procedure.

Quality indicators	Targets
% of comments of reviewers addressed by the Deliverable Leaders/authors	100%
Average Delay (in days) in the submission of draft deliverables for internal review	0
Average Delay (in days) in the submission of the final deliverables to the European Commission	0
Average number of inconsistencies according to the deliverable template (format, layout, spelling, etc.) in the versions ready for the final editing before submission	<3
% of internal effort reports delivered on time	>80%

Quality indicators	Targets
Delay (in days) in the submission of the periodic report	0
Delay (in days) in the submission of the final report	0

### 3.2. Risk management plan

The risk management plan consists of:

- the identification of the technical (research-oriented) and management (project implementation-related) risks;
- the assessment of their degree of occurrence, and their potential impact on the project; and,
- the identification of measures to be implemented if and when necessary to reduce the likelihood of these risks materialising.

The anticipation of the risks associated with project activities and the corresponding corrective measures are crucial to the success of the project. Annex I include the project risk register, which lists potential risks identified during the writing stage of the project, both for the execution of the project and the longer-term impacts of Root2Res. Each risk is associated with probability of occurrence, potential impacts on the project and risk mitigation measures.

A Risk issue log (Annex II) has also been created to allow partners to share any issues they are encountering during project implementation. These issues will be closely monitor by the project management team to ensure they do not turn into actual risk to the project. This will be regularly updated during the project.

## 4. ANNEXES

### 4.1. Annex I. Root2Res Risk Register (28/02/2023)

Risk ID	Description	Risk Owner	Probability	Impact	Risk Mitigation Measures
	<b>Description of the risk</b>	<b>Person who monitors the risk</b>	<b>High, Medium or Low</b>	<b>High, Medium or Low</b>	
<b>1</b>	Risk of project fragmentation		Medium	Medium	Root2Res will have a robust project management structure, where work is planned with clearly assigned responsibilities and obligations for all partners. A delivery mitigation procedure will be defined in the Consortium Agreement.
<b>2</b>	Reliance on sharing data		Medium	High	Root2Res has dedicated activities and tasks to ensure the effective management of data (including collation and harmonisation).
<b>3</b>	Unrepresentative field trials data for a crop and/or location		Medium	High	Most field trials have been planned so that they can be repeated the following year should bad weather affect crops and are conducted for a specific crop in different locations within the consortium. Moreover, in hub sites in all ACZ we have the ability to control water availability through rainout shelters and/or irrigation and therefore will be able to circumvent any issues with variable precipitation.

Risk ID	Description	Risk Owner	Probability	Impact	Risk Mitigation Measures
4	Lack of delivery of seeds		Low	High	A robust plan for multiplying and delivery of seed to the various WPs on time is developed. Where small numbers of genotypes are needed (WP1, 2, 5) selection of cultivars representing the ideotypes defined could be made from commercially available seed stocks to replace material generated by the project. When large numbers of genotypes are needed (WP4), sub-selection of populations will be made if delivery of seed encounters some issues.
5	Lack of delivery of phenotyping tools		Low	High	Many of the phenotyping tools used by the project will require only minor development for specific use. Some of them will require development to be applicable at scale, posing a risk to delivery. Mitigation against the risk will include using fewer phenotyping traits and concentrating on those tools already well established.
6	Lack of delivery of modelling tools		Low	Medium	Calibration and modelling could encounter difficulties for a set of genotype/crop in a given environment. The mitigation measure would be to rely on well characterized genotypes and extrapolate the results to others, based on phenotyping data and literature.



Risk ID	Description	Risk Owner	Probability	Impact	Risk Mitigation Measures
7	Lack of delivery of ideotype definition		Low	High	We have several approaches to defining the ideotype from both existing and novel information, which means the risk of not defining the ideotype is low. If no consensus can be reached, then existing literature definitions of ideotypes will be used.
8	Lack of identification of ideotypes in the germplasm		Medium	High	Selection of ideotypes from existing germplasm assumes that relevant genotypic and phenotypic variation exists, and that we have the information to link genotype with phenotype. It is especially risky for less studied species. Our ultimate mitigation would be to only identify ideotypes in the well-studied species. However, the work in WP4 on phenotyping will generate relevant information for all species, which can be rapidly fed into the selection of ideotypes for testing in WP1
9	Little engagement of stakeholders' groups		Low	High	Co-creation of ideotypes with stakeholders' group will ensure engagement

#### 4.2. Annex II. Root2Res Issues Log (28/02/2023)

No issue has been logged as of February 28<sup>th</sup> 2023.

Issue ID	Description	Partner Concerned	Partner Affected	Action Taken	RAG Status
	Description of the issue	Person who is affected by the issue	Person who it will impact on	Description of the mitigation measures used	Select Red, Amber or Green
1					
2					
3					