RAINS

D7.4. Cooperation strategy with JRC

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1.1. Deliverable Information Sheet

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Contributing Partners	SAV, REVOLVE
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1.2. Revisions

April 02th ,2025	Ver 1.0 - First draft
April 28th , 2025	Ver 2.0 - Second draft
May , 2025	Ver 3.0 - Final version

1.3. List of Acronyms

Acronym	Definition
EC	European Commission
EU	European Union
RAINS	Resilient Agricultural Irrigation systems for water Scarcity in Europe
JRC	Joint Research Centre
EC	European Commission
EU	European Union
LCA	Life Cycle Assessment
PEF	Product Environmental Footprint
ILCD	International Reference Life Cycle Data System
WEI+	Water Exploitation Index Plus
GIS	Geographic Information System
CSV	Comma-Separated Values
NetCDF	Network Common Data Form
WP	Work Package
DoA	Description of the Action
CO	Coordinator
BEN	Beneficiary

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3. Executive summary

In the last years, extreme weather patterns of water scarcity (droughts) and water abundance (floods, rapid showers) are becoming more frequent and prolonged in the EU. If we do not remedy this situation, by 2050 water scarcity will lead to €12,2 billion losses per year and affect 17% of EU population. RAINS project wants to contribute into the improvement of the resilience of EU agriculture to water scarcity by demonstrating 10 solutions (irrigation practices, technologies and tools) that will increase the efficiency of water and nutrient management in agriculture and reduce the impact of extreme weather events.

RAINS solutions include alternative forms of water supply, combined use of water and biofertilisers, improved soil water-retention, water-N/P modelling and some smart solutions (Optifangs-IA, WaterIQ) to contribute to decision-making and to integrated irrigation management across farm systems. Over the project duration, these solutions will be demonstrated at 10 demo-farm systems representing agroecology, organic production, conventional, intensive and urban agriculture, replicated in Greece and Spain. RAINS will also develop a hydrological and N/P model to optimised agriculture production at catchment level. Furthermore, we will conduct co-creation workshops, knowledge transfer activities and create materials such as guidelines (2), White Papers (2) and Practice Abstracts (40).

Policy focused sessions will deliver 3 sets of policy and incentives recommendations, engaging quadruple helix agricultural stakeholders, to pave the way for the uptake of sustainable irrigation and fertilization management solutions in practice in the EU.

In the long term, RAINS will contribute to improve water efficiency by 50% in 12,700 ha in more than 20 EU regions, and support >500 farmers in the transition to a more sustainable irrigation. And by 2050, the implementation of the RAINS project will save up to €6.1 billion, 244.348 million litres of water and 35.4 t CO2eq avoided emissions.

Within WP7 The **RAINS** project (Resilient Agricultural Irrigation systems for water Scarcity in Europe) aims to improve the resilience of EU agriculture to water scarcity through innovative irrigation solutions. To maximize its impact, RAINS will actively **cooperate with the Joint Research Centre (JRC)** of the European Commission. This strategy outlines how RAINS will align its methodologies with those used by JRC and how a structured collaboration will be maintained. By harmonising our approach with JRC's, RAINS results can be seamlessly integrated into JRC tools related to **water use and availability**

Ultimately, this cooperation will ensure that RAINS contributes effectively to EU-wide water resource assessments and policy planning.

RAINS has already initiated this collaboration with the JRC by holding an initial meeting with JRC scientists Mr. Alberto Pistocchi and Mr. Yanni Trichakis, who have confirmed their willingness to participate in the project as

external scientific collaborators. Their expertise in water resource modeling and policy support will help ensure alignment and integration of RAINS results with JRC methodologies and tools.

3.1. RAINS Project

RAINS will contribute to improve the resilience of EU agriculture to water scarcity by demonstrating 10 solutions (irrigation practices, technologies and tools) that will increase the efficiency of water and nutrient management in agriculture and reduce the impact of extreme weather events.

The RAINS solutions include alternative forms of water supply, combined use of water and biofertilisers, improved soil water-retention, water-N/P modelling and some smart solutions (Optifangs-IA, WaterIQ) to contribute to decision-making and to integrated irrigation management across farm systems.

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In the long term, RAINS will contribute to improve water efficiency by 50% in 12,700 ha in more than 20 EU regions, and support >500 farmers in the transition to a more sustainable irrigation. And by 2050, the implementation of the RAINS project will save up to €6.1 billion, 244.348 million litres of water and 35.4 t CO_{2eq} avoided emissions.

3.2. The Consortium

RAINS consortium is led by SAV, a Spanish company dedicated to water and waste management with a huge background in agriculture and biotechnology, and complemented with experts from the quadruple helix such as agri-food and water researchers (UMH, AIMPLAS, ELGO, UPM, UL), industry (AGAP, WE, CWP) and farmers representatives (AGUA, ACP), experts on impact assessment of agricultural practices (ARCHA), as well as regional authorities (CADRET, RNA) and Dissemination, Communication (D&C) and Exploitation experts (REVOL, ACC) (Figure 2). Successful achievement of the project objective will be guaranteed by the multi-actor, interdisciplinary

and transdisciplinary work of the team behind RAINS. The consortium ensures geographical coverage for countries suffering the most from water scarcity and abundance events, in the south of the EU and the Mediterranean, and considers the involvement of representatives from additional EU countries that suffer or will suffer from the same climate change impacts.

Table 1. List of RAINS Partners.

N.	Role	Short name	Legal name	Country
1	COO	SAV	SOCIEDAD ANONIMA AGRICULTORES DE LAVEGA DE VALENCIA	ES
2	BEN	UMH	UNIVERSIDAD MIGUEL HERNANDEZ DE ELCHE	ES
3	BEN	AGAP	AGRICULTURAL APPLICATIONS IKE	EL
4	BEN	AIMPLAS	ASOCIACION DE INVESTIGACION DE MATERIALES PLASTICOS Y CONEXAS	ES
5	BEN	ELGO	ELLINIKOS GEORGIKOS ORGANISMOS - DIMITRA	EL
6	BEN	UPM	UNIVERSIDAD POLITECNICA DE MADRID	ES
7	BEN	UL	UNIVERSITEIT LEIDEN	NL
8	BEN	ARCHA	ARCHA SRL	IT
9	BEN	AGUA	Juzgado privativo de aguas de Guardamar del Segura	ES
10	BEN	ACP	AGROTIKOS SYNETAIRISMOS PETRAS	EL
11	BEN	CADRET	CONSELLERIA DE AGRICULTURA GANADERIA Y PESCA	ES
12	BEN	RNA	PERIFEREIA VOREIOU AIGAIOU	EL
13	BEN	REVOL	REVOLVE PLANET	BE
14	BEN	ACC	ATLANTIS PERIVALLON KAI KAINOTOMIA LIMITED	CY
15	BEN	WE	WATER EUROPE	BE
16	BEN	CWP	ASOCIACION CATALANA PARA LA INNOVACION Y LA INTERNACIONALIZACION DEL SECTOR DEL AGUA, CATALAN WATER PARTNERSHIP (CWP)	ES
17	BEN	PROBEL	PROBELTE SA	ES

4. Objectives

Align Methodologies: Ensure that the methods and data formats used in RAINS (for both implementation and impact assessment tasks) are harmonised with JRC's methodologies. This will enable RAINS outcomes to be compatible with European-level models and indicators of water use and availability (e.g. water scarcity indices, hydrological models).

Facilitate Integration into JRC Tools: Adapt RAINS results so they can feed into or be added as scenarios in JRC's existing tools for water resource analysis. For instance, improvements in irrigation efficiency demonstrated by RAINS should be representable in the Commission's water availability estimation frameworks.

Structured Collaboration: Establish a clear cooperation framework with JRC, including regular interactions (at least one formal meeting per year) to share progress, data, and results. This will provide JRC with timely insights from RAINS and allow the project to receive feedback or guidance from JRC experts.

Support EU Policy: By aligning with JRC (the EC's science service), ensure RAINS contributes to the knowledge base supporting EU water policy and climate adaptation. The collaboration will help translate project findings into broader policy-relevant context, amplifying RAINS's impact.

5. Methodological alignment plan

Approach: RAINS will review and adapt its scientific and technical methodologies to match those used by JRC in water resource assessments. Early in the project, a dedicated session with JRC experts will identify the specific JRC tools, models, and data standards relevant to RAINS. The alignment plan will cover both the **implementation phase metrics** and the **impact assessment methodologies**, as detailed below.

Demonstration & Implementation Tasks: RAINS is testing irrigation solutions on demo farms in Spain and Greece. The data collected (e.g. water withdrawal, irrigation efficiency, crop yield, soil moisture) will be formatted and analyzed using definitions consistent with JRC's practice. For example, water savings achieved will be quantified in a way that aligns with European water scarcity indicators like the Water Exploitation Index (WEI+). By doing so, the regional results from RAINS can be compared or aggregated at basin scale consistent with JRC's water availability models. If JRC uses hydrological models such as LISFLOOD or similar for water resource estimation, RAINS will ensure that inputs (rainfall, irrigation demand, etc.) and outputs (reduced water abstraction, improved soil water retention) from our demo sites are compatible with those model parameters. This may involve using common units, time scales, and reference scenarios (e.g. baseline climate conditions) that JRC employs.

Environmental Impact Assessment: RAINS will perform life cycle assessment (LCA) of its solutions (e.g. measuring environmental footprints like water footprint, carbon footprint, nutrient runoff). We will adopt JRC-endorsed LCA methodologies wherever applicable. For instance, RAINS will use the Product Environmental Footprint (PEF) or ILCD guidelines (developed with JRC) to evaluate environmental impacts consistently. By using these standard methods, our results (such as water footprint reduction per unit of crop yield) can be directly comparable to or integrated with JRC's analyses of agricultural water use. Additionally, any assessment of water availability improvement from RAINS (e.g. increased groundwater recharge from certain practices) will align with JRC's water resource accounting frameworks to ensure consistency in how "available water" is defined and measured.

Socio-economic and Health Impact Assessment: RAINS also assesses socio-economic benefits (farm income, cost savings, market potential) and any health impacts of improved irrigation (e.g. reduced pathogen exposure from safer water reuse). These assessments will be guided by JRC's methodologies for impact evaluation. For socio-economic analysis, RAINS will incorporate indicators and models compatible with those JRC uses in evaluating agricultural and climate adaptation projects (such as cost-benefit analysis formats or macro-economic scenario

inputs). For example, if JRC has a model for economic impact of water scarcity measures, RAINS will format its data (e.g. % yield loss avoided, costs of technologies) so JRC can plug them into their broader assessments. Health impact considerations (like reduction in water-borne risks) will follow EU and JRC guidelines on health risk assessment to ensure any findings can inform JRC's environmental health protection researchwater.jrc.ec.europa.eu.

Data and Format Harmonisation: All data resulting from RAINS (field measurements, model outputs, GIS layers) will be stored in standard formats agreed upon with JRC. Spatial data will use common geographic information system (GIS) standards and align with European databases (for instance, using INSPIRE-compliant formats for any geospatial information). Quantitative results will be shared in open data formats that JRC's tools can readily ingest (e.g. CSV or NetCDF for time-series, following agreed templates). By planning this upfront, we avoid mismatches and ensure smooth data transfer to JRC's knowledge platforms. The JRC Knowledge Hub for Water, which provides data tools to support EU water policywater.jrc.ec.europa.eu, will be a reference point – RAINS outputs will be prepared so that they could potentially be uploaded or linked to this Hub for wider access by JRC and policy makers.

Integration of RAINS Scenarios into JRC Models: A specific goal is to allow JRC to create a "RAINS scenario" within their European water models. This means JRC could simulate what RAINS's solutions achieve if scaled up. To enable this, RAINS will provide model-ready information such as: percentage improvements in irrigation efficiency, volumes of alternative water resources used (e.g. reclaimed water), reductions in fertilizer runoff due to our practices, etc. These will be aligned with the baseline assumptions JRC uses for Europe. For example, if JRC's water availability model has scenarios for improved irrigation technology adoption, RAINS will supply the evidence-based parameters for such a scenario (drawn from our demo results). By aligning methodologies now, by the end of the project JRC can directly incorporate RAINS findings as a scenario in their EU-wide water stress simulations – demonstrating, for instance, how RAINS innovations could reduce water stress in Mediterranean basins under future climate conditions.

This methodological alignment plan will be refined in collaboration with JRC during an initial meeting (see below) and updated as needed. The plan ensures that from field data gathering to final impact indicators, RAINS speaks the same "language" as JRC's tools, paving the way for high-level integration of results.

6. Collaboration Mechanism and timeline

The collaboration mechanism with JRC builds on an already established relationship with JRC scientists Mr. Alberto Pistocchi and Mr. Yanni Trichakis, who have agreed to participate in the project. Their involvement will include attending the annual coordination meetings, reviewing RAINS methodology, and contributing to the alignment and integration of project outcomes with JRC tools and models.

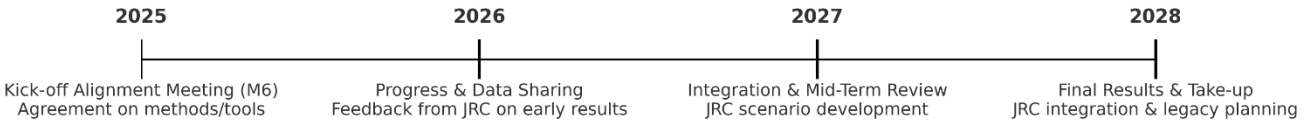

Figure 1: Timetable

To implement the above plan, RAINS will engage in a structured collaboration with JRC throughout the project. The mechanism includes regular meetings, defined communication channels, and coordinated milestones:

- **Dedicated Contact Points**: RAINS has designated a JRC Liaison Team led by the Project Coordinator (SAV) and involving key technical partners. This team will interface with the relevant JRC unit (e.g. JRC experts in water resources and agriculture) to organize activities and exchange information. Both sides will identify primary contacts to ensure continuity.

- **Annual Coordination Meetings:** At least **one meeting per year** will be held with JRC to exchange knowledge, share progress, and plan integration steps. These meetings will be timed to align with project milestones and JRC's input needs. The tentative schedule is:
    - **2025 (Year 1)** – *Kick-off Alignment Meeting (M10)*: Introduce RAINS objectives and methodology to JRC, agree on which JRC tools and data standards to align with, and review the initial

Methodological Alignment Plan. This meeting (around spring 2025) establishes the working relationship and sets immediate next steps (e.g. data format agreements).

- **2026 (Year 2)** – *Progress & Data Sharing Meeting*: Present preliminary results from the first irrigation season and any early impact assessment findings. JRC will provide feedback on data quality/compatibility and advise on incorporating these results into their models. Any updates to methodologies (either from RAINS or new JRC developments) will be discussed to keep approaches harmonised.
- **2027 (Year 3)** – *Integration & Mid-Term Review Meeting*: By this stage, RAINS will have significant data (possibly the end of the second year of demonstrations and initial impact analyses). The meeting will focus on how these outcomes can form a coherent scenario for JRC tools. We will review the timeline for feeding data into JRC's analyses (e.g. upcoming JRC reports or model runs) and ensure that RAINS' ongoing work is aligned with those. Any barriers to integration will be addressed jointly.
- **2028 (Year 4)** – *Final Results & Take-up Meeting*: As RAINS nears completion, the final annual meeting will present the consolidated results (final impact assessments, validated solutions). Plans will be made for **final integration** of RAINS data into JRC's systems. For example, JRC might run a simulation using RAINS outcomes or publish an analysis including RAINS data. Additionally, discussion will cover sustaining the collaboration post-project (e.g. continued data updates or joint publications).

- **Additional Interactions:** Between formal yearly meetings, working-level exchanges will occur. This can include technical workshops (e.g. RAINS data team and JRC modelers debugging data integration), JRC experts attending RAINS consortium meetings or field visits, and sharing of interim reports. We will maintain an open communication channel (email group or collaborative platform) where RAINS can ask JRC questions on methodology and JRC can request clarifications or preliminary data. Minutes or action points from each annual meeting will be documented and followed up by the RAINS consortium to ensure progress on the cooperation actions.

- **Data Sharing and Access:** A protocol will be established for how RAINS shares data with JRC. Given the sensitive nature of some data, appropriate access levels will be decided (all public-ready data will be freely shared, while any sensitive data might be shared under confidentiality if needed). JRC may provide access to certain tools or databases for RAINS partners to use (for example, access to the **Knowledge Hub for Water** or specific JRC datasets on water resources). The timeline for data sharing will sync with RAINS's

internal timeline – e.g. after each demo season's data is processed, it will be delivered to JRC in the agreed format.

- **Feedback Loop:** The collaboration is two-way. JRC's feedback on RAINS methodologies or findings will be recorded and used to adjust project activities if beneficial. For instance, if JRC suggests using an alternate indicator for water stress that better fits their models, RAINS will consider adopting it for subsequent analyses. This adaptive approach ensures the project remains aligned with JRC's state-of-the-art tools throughout its duration.

The timeline and collaboration mechanism are designed to be flexible but structured – ensuring at minimum the yearly knowledge exchange, while allowing more frequent contacts as required. By planning the meetings and data exchanges early, RAINS can allocate resources and time for these activities, making JRC cooperation an integral part of the project workflow rather than an add-on.

7. Roles and responsibilities

All **RAINS consortium members** will contribute to this cooperation strategy, reflecting the project's collective commitment to align with JRC. However, certain partners have specific roles to play:

- **Project Coordinator (SAV)** – As lead beneficiary for the "Cooperation strategy with JRC" deliverable, SAV coordinates the overall effort. SAV will schedule and chair the annual JRC meetings, ensure invitations and agendas are prepared, and maintain the relationship with JRC contacts. The coordinator also oversees that the action points from meetings (e.g. data to send, method adjustments) are executed by the relevant partners.

- **Technical Work Package Leaders** – Partners leading the development of RAINS solutions and the impact assessment WPs have the primary responsibility for **methodology alignment** in their domains:
    - *Demonstration Leads (WP2 & WP3)*: **SAV** (Spain demos lead) and **ELGO** (Greece demos lead) will ensure the data collected in demos (irrigation performance, etc.) meet the agreed standards. They will work with the scientific partners to format results for JRC. Additionally, **UPM** (leading the catchment modeling task) will align the GRAFS model and nutrient budgeting approach with JRC's nutrient and water flow methodologies, given JRC's expertise in integrated nutrient management.
    - *Impact Assessment Leads (WP4, WP5, WP6)*: **ARCHA** (leading environmental and health impact analysis) will incorporate JRC-recommended impact indicators and LCA methods. **ACC** and **WE** (leading socio-economic impact and exploitation tasks) will align their market and policy analysis with JRC's approaches (e.g. using JRC data on water economics or policy frameworks as references). These partners will be responsible for presenting their methodology to JRC for feedback and adjusting as needed.
    - Each WP leader will also contribute to presenting their results during JRC meetings and prepare any technical documentation required by JRC to understand or use the data.

- **Dissemination & Communication Lead (REVOLVE)** – Since WP7/8 deals with dissemination, REVOLVE will support the production of this strategy document and ensure it is communicated appropriately (the deliverable is public). REVOLVE will also help maintain the collaboration by disseminating joint activities

(for example, if a meeting with JRC yields interesting insights, it can be shared via project news or used in communications to stakeholders, highlighting that RAINS is aligning with European scientific services).

- **All Partners** – All consortium members have a stake in the JRC cooperation. At least **one representative from each partner** is expected to join the annual JRC meetings (especially those who can speak to technical details or uptake of results). Partners will contribute information about their tasks to the strategy as required. For example, if a technology provider partner has specific data output, they must ensure it's shared in the agreed format. Likewise, if policy-related partners (like **Water Europe (WE)** or **CWP**) have connections to JRC or relevant platforms, they will leverage those to strengthen cooperation. The idea is that aligning with JRC is a cross-cutting responsibility: everyone developing or collecting something in RAINS should think, "Can JRC use this? Is it in the right format?" – with the WP leaders and coordinator orchestrating these efforts.

- **Joint Research Centre (External)** – While JRC is not a formal consortium member in RAINS, we assign them a consultative role in this strategy. JRC will be invited to nominate experts (e.g. from its Water and Marine Resources unit) to attend the yearly meetings. They may also review key RAINS documents or deliverables related to methodology (upon request) to ensure compatibility. It's understood that JRC's contributions are advisory and aimed at mutual benefit – the RAINS consortium remains responsible for its deliverables but will earnestly consider and incorporate JRC's advice.

By clearly defining these roles, RAINS ensures that the cooperation strategy is implemented efficiently. The technical partners know what is expected in terms of alignment, the coordinator and dissemination lead manage the process, and all partners remain engaged. This collective approach will help embed the JRC alignment task into day-to-day project activities.

8. Conclusions

In summary, the **Cooperation Strategy with JRC** for RAINS establishes a roadmap for aligning our project with the European Commission's scientific and policy support tools. Through harmonised methodologies and regular knowledge exchange, RAINS will produce results that are not only impactful at the local level of our demo farms, but also **directly relevant at the European scale**. This strategy ensures that RAINS outcomes – improved irrigation practices, water saving metrics, impact assessments – can feed into JRC's analyses of water use and availability across Europe, effectively creating a bridge between our on-the-ground innovations and high-level policy modeling.

By planning joint meetings and mutual feedback loops, we anticipate a dynamic collaboration: RAINS will benefit from JRC's vast expertise (keeping our methods robust and comparable), and JRC will benefit from real-world data and innovations emerging from RAINS. The timeline of interactions and the assignment of responsibilities detailed above provide a clear path to follow over the project's 4-year duration.

As a result of this cooperation strategy, we expect by project end that **RAINS data will be integrated into JRC's water resource tools** (for instance, as new scenarios in water scarcity models or contributions to the Knowledge Hub for Water), demonstrating the scalability and relevance of RAINS solutions for Europe's water challenges. This will amplify RAINS's impact, supporting evidence-based policy decisions on sustainable water use in agriculture. Moreover, the partnership with JRC sets a precedent for continued cooperation beyond RAINS – leaving a legacy where project innovations continue to inform and enhance European water management efforts.

Overall, the RAINS consortium is committed to this cooperative approach with JRC, confident that it will enrich the project's outcomes and ensure that **"no data or insight is left behind"** when it comes to shaping a more water-secure future for Europe. By working hand-in-hand with the JRC, RAINS will contribute to a cohesive European effort to tackle water scarcity, fully in line with Horizon Europe's goals and the needs of EU policy makers.

9. References

1. **European Commission Joint Research Centre (JRC)** – *Water and Marine Resources Unit*: https://joint-research-centre.ec.europa.eu/water-and-marine-resources_en
2. **JRC Knowledge Hub for Water** – European Commission platform for water-related data and tools: https://water.jrc.ec.europa.eu/
3. **LISFLOOD – A spatially distributed hydrological model** (used by JRC for water availability and flood/drought modeling):
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