# Novafert

# D1.4 – Selection of lighthouse demos

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# Table of Contents

1. Introduction ..... 3
2. Methodology ..... 4
3. Lighthouse demonstrations selected in each region ..... 9
4. Conclusion ..... 10

Figure 1. Lighthouse demonstration protocol ..... 6
Figure 2. Illustration of NOVAFERT lighthuse demo selection ..... 8

Table 1 Overview of methodology for selecting lighthouse demonstrations ..... 6
Table 2 Outline of lighthouse demonstrations ..... 9



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# 1. Introduction

Novafert sees Lighthouse demonstrations as instruments to accelerate the creation and uptake of nutrient recycling solutions and reduce the dependence on chemical fertiliser for crop production. This document/report on the establishment of lighthouse demos continues the earlier work on this topic (as reported in D1.3 Atlas of EU nutrient-related living labs). The main objective is to support the preparation to set up 7-10 lighthouse demos across the EU, which showcase exemplary performance in the field of nutrient recycling with locally available alternative fertilisers and crops relevant to the region. Lighthouse demos will act as knowledge exchange hubs for other groups of farmers. Each lighthouse demo will be expected to host at least 5 groups of farmers to see the practical side of fertiliser product use, including cost, application strategies, and mineral fertiliser replacement values, with the support of the project partners. It is anticipated that lighthouse demos and front farmers will inspire other European farmers (30-50 new farmers) to look at alternative sources of fertilisers to displace a portion of imported chemical fertilisers.



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## 2. Methodology

Lighthouse demonstrations are defined as places for demonstration of solutions, training and communication that are exemplary in their performance in terms of nutrient recycling. This definition follows the EU Commission's definition within the EU mission and aligns with the objectives for the lighthouse demonstration activity set out in the grant agreement of the NOVAFERT project. The first stage of the process was to identify Novafert nutrient-orientated living labs with the potential and capacity to conduct practical demonstration activities within the framework of WP4. This was carefully addressed during the work package meeting in month 10, and it was decided to provide an example protocol template. Accordingly, a demonstration protocol template was created by Teagasc to capture the objective, scale, anticipated data collection, and interest for stakeholders of potential demos. By month 11, this protocol was distributed, and by month 13, it was completed by interested NOVAFERT partners. The template was also reviewed at the third general assembly in month 13 to ensure that each area's lighthouse met the requirements. Also, before creating the methodology, we discussed it with IAB members and shared it with them for feedback and approval after we had the primary version. This procedure provided a preliminary list of 53 nutrient-orientated living lab candidates (reported in D1.3). The screening process documentation in this deliverable (D1.4) resulted in selecting 7 lighthouse demonstrations from the 53 nutrient-orientated living lab candidates.



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| Living lab Information |
|---|
| **Demonstration Overview** |

**Name**

**Location:**

**Type of system (industry, farmer, research institute…)**:

**Geographical scale (regional, local, national…):**

**Living Lab manager/promoter/coordinator:**

| **Partners involved in the Living Lab** | |
|---|---|
| | Organisation type: e.g., regional authority |
| | Organisation type: |
| | Organisation type: |

**Overall concept of the activities to be implemented**

**Please describe main goals, objectives and innovations in relation to the recovery of innovative bio-based fertilising products**

**Please specify the scale of the facility, the services that the living lab is offering (provide data, demo site, pilot of a project, prototype…) and the main waste type treated**

**Technical dimension**

**A brief description of technologies applied, TRL at project start, funding source**

**A brief description of the expected characteristics of the bio-based fertilising products recovered**

**Please describe existing LCA analyses**

**Please include a photo of the living lab**



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*Figure 1. Lighthouse demonstration protocol*

## Selection criteria for lighthouse demonstrations

A procedure for the selection is proposed here to choose 7-10 lighthouse demonstrations from selected living labs outlined in (D1.3). This selection procedure was also validated by the international advisory members in a dedicated meeting with the board.

*Table 1 Overview of methodology for selecting lighthouse demonstrations*

| | | |
|---|---|---|
| SCALE | Site: Farm, cooperation of number of farms, trial site etc. |  |
| AIMS | Aims to demonstrate excellent performance in terms of alternative fertiliser use within their system |  |
| ACTIVITIES | Activities aimed at demonstration, dissemination and exploitation of a high-performance system using alternative fertilisers |  |
| PARTICIPANTS | Engagement of potential future users and target audiences e.g. farmer discussion group |  |
| CONTEXT | Place based that operates within a real-life demonstrative context in a suitable location relevant to the region |  |



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Priority selection criteria 1: **Scale:**

Nutrient recycling lighthouses serve as designated sites, which can encompass a single agricultural field or a collaborative effort involving multiple farms. Their primary objective is to showcase outstanding performance in substituting chemical fertilisers with alternative options that is locally available to crops relevant to the region. These sites function as a platform for a range of activities aligned with WP4 and WP6 activities. While lighthouses may engage in experimentation and co-creation within the framework of living labs, they can also function independently. Before selecting the lighthouse, the demonstration capacity on each of the solutions was analysed, which combined both the scalability of solutions within the project lifetime and the infrastructure at hand, allowing a TRL lift within and by the end of the project. Lighthouse demos must be equipped with appropriate resources that are fit for purpose, are open to sharing data from the system, and the lighthouse manager/coordinator has appropriate agro-technical expertise.

Priority selection criteria 2: **Activities:**

Lighthouse activities revolve around three main pillars: demonstration, dissemination, and exploitation. These encompass active networking and the organisation of on-site demonstrations. Novafert lighthouse demonstrations will be expected to host other groups of farmers (around five groups of farmers per lighthouse demonstration) to see the practical side of alternative fertiliser product use, including cost, application strategies, and mineral fertiliser replacement values. Exploitation is the use of results for commercial purposes or in public policy making.

This phase also often includes experimenting and fostering innovation. For instance, through participatory monitoring, potential future users become integral to the process of assessing the impact of specific practices or approaches. This ongoing involvement allows for further refinement and simultaneously showcases the effects to a broader audience.

Priority selection criteria 3: **Participants:**

Lighthouse participants can vary in complexity, resembling living labs but not necessarily requiring the same level of complexity. Partnerships can range from solely involving landowners and researchers. The central focus remains on demonstrating the positive outcomes to future users or target audiences who may consider adopting these practices within their own systems. Therefore, lighthouse demonstrations for Novafert will ideally have field-based application of alternative fertilisers integrated into nutrient management plans with real life sites on a large scale that is open to testing and validation of new technologies.



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Priority selection criteria 4: **Context:**

Lighthouses, much like living labs, operate within a place-based project situated in a real-life demonstrative context suitable to the region's cropping system. However, lighthouses adhere to clearly defined and more stringent system boundaries compared to living labs. Since agriculture varies widely based on geographical location, climate, soil types, and other local factors, demonstrations must be contextualised to the specific conditions of the region where they are being implemented. Understanding the local context ensures that the demonstrated practices are relevant and applicable. The economic context of a demo is also crucial.

Farmers need to know not just the technical aspects of a demonstrated solution but also the economic implications. This includes considerations of cost-effectiveness, return on investment, and potential income generation. The financial viability of an innovation is often a key determinant of its adoption. The LH demo should also consider and highlight the environmental implications of the demonstrated practices, ensuring that they contribute to sustainable and environmentally friendly farming practices.

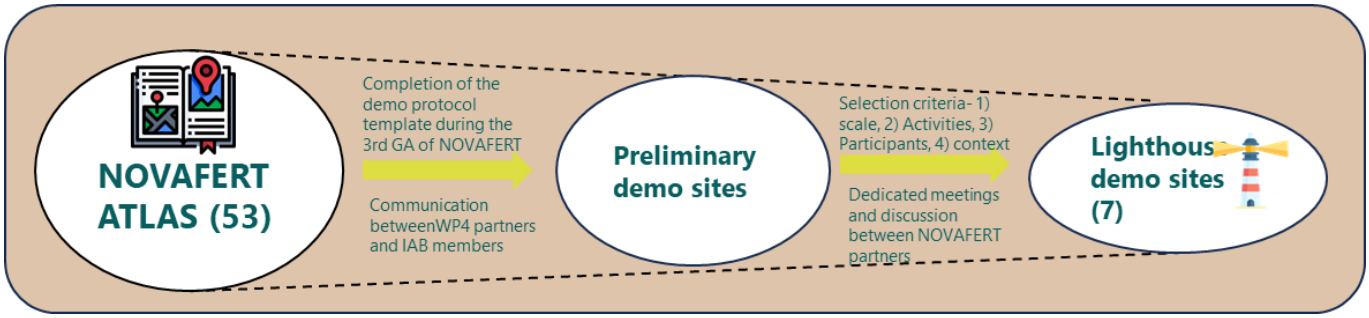


*Figure 2. Illustration of NOVAFERT lighthouse demo selection*



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## 3. Lighthouse demonstrations selected in each region

The target number of candidates to act as a nutrient-orientated living lab was 50 plus, as outlined in the grant agreement. It was decided within the consortium to have a target of 7-10 nutrient-orientated living labs within each region to get an even distribution and representation of each region within the project. Teagasc received all potential candidates from the partners in month 13 following the distribution of the lighthouse demo protocol and had a total of 65 potential candidates. Following a screening process using the methodology outlined in (D1.3 *atlas of EU nutrient-related living labs*), candidates were eliminated to a total of 53, which satisfied the total requirement of 50 +. Each region within the consortium selected a suitable site from the atlas that aligned the selection criteria 1-4 of nutrient-orientated labs (D1.3 *atlas of EU nutrient-related living labs*). The selected lighthouse demo has a lighthouse icon placed within the atlas to indicate and define it as a selected lighthouse demo. From this process, a total of 7 lighthouse demos (outlined in Table 2 Outline of lighthouse demonstrationshave been selected within each region of the consortium and will serve as the basis for WP4 activities.

*Table 2 Outline of lighthouse demonstrations*

| Demo title | TRL | Agro-typology | Country, Scale |
|---|---|---|---|
| Teagasc, grassland trial | 6 | A range of manure and dairy processing residues applied at field scale to assess agronomic performance. | Ireland, National |
| Municipal water and sewerage company | 9 | Converting sewage sludge into a high DM fertiliser product which contains N, P & K for plant growth. | Poland, National |
| Pirtea porsas | 9 | Digesting pig slurry through AD and separating it into a liquid and solid fraction before applying to land. | Finland, Regional |
| Inagro | 9 | Farm-scale anaerobic digestion of agro-residues/pig manure to increase local nutrient cycling & improve nutrient use efficiency. | Belgium (Flanders), Regional |
| Axarquía Sostensible | 9 | Waste water treatment from agriculture using a water reclamation system, integrated with an irrigation system with software for the management of nutrients in reclaimed water. | Spain (Andalusia), Regional |
| Fertinagro | 9 | Design, production and marketing of organic fertilisers using recovered nutrients from organic materials of animal and plant origin (animal manure, animal by-products, plant waste etc.). Offer personalised nutrient management plans for the farmers using their products | Spain (Aragon), National |
| OPG Dario Cenger | 9 | Treatment of plant materials and manure from livestock production in AD for biogas production. | Croatia, Regional |



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# 4. Conclusion

Throughout the selection process of nutrient-orientated living labs and shortlisting to lighthouse demonstrations, the Novafert consortium accessed a large community of front-running farmers and entrepreneurs and work being carried out in a scientific context. Within this, Novafert is continuing and building on previous work that has been carried out in previous EU-funded projects such as Nutri2cycle and other EU projects in which members of the consortium are/was involved. As a result, it has led to access to infrastructure and resources that are suitable for demonstration at a relevant scale with the support of relevant stakeholders. This has allowed the project to develop an existing lighthouse demo network without the need to invest heavily in the project itself or expect businesses themselves to invest to be a part of the Novafert lighthouse demo network.

The lighthouse demo network covers a broad range of processing technologies and derived products with a link to field-based applications to assess the agronomic performance/effects of such operations. The network represents the use and recovery of valuable nutrients from a range of different waste streams, including bio-waste and biological by-products, Animal manure, wastewater, sewage sludge and digestate.

The lighthouse demo network will serve as the main basis for work package 4 (accelerate market uptake and exploitation of lighthouse network results) activities but will also contribute to work package 2 (LCA analysis), work package 3 (supporting policy formulation to overcome existing barriers & implementation at local & EU level), work package 5 (stakeholder engagement) and work package 6 (communication and dissemination, networking and synergies with other EU projects and international organisations.



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