POLIRURAL plus

DEVELOP CALL

Financial Support for Third Parties

Mid-term progress Report Part A (Public)

Field2Fork AI Hub

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Organisation	EXO and DARe Puglia
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Table of Contents

Executive Summary

Field2Fork AI Hub aims to develop an AI-powered conversational tool that supports users throughout the purchasing journey for local fresh produce, especially fruit and vegetables. Acting as a “Personal Farmer” assistant, the system helps users identify suitable products based on their needs and preferences, automates product discovery and cart composition, and then redirects them to the marketplace to complete the purchase. In this way, the project combines a more intuitive shopping experience for consumers with greater visibility and market access for local producers, contributing to stronger and more resilient rural communities.

During the reporting period, work focused on the initial development and technical validation of the solution. The team analysed and selected the core technology stack, including PrestaShop, MariaDB, Redis, and LangGraph/LangChain, and developed a first working Python-based prototype capable of interfacing with the existing PHP-based PrestaShop environment. The chatbot was also successfully integrated into external environments, including Streamlit and Chainlit, to enable early testing and interaction flows. In parallel, the first set of APIs required to connect the AI assistant with the services used by PrestaShop was completed.

These results confirm the technical feasibility of the approach and represent an important step toward the project’s expected impact: an AI-enabled digital marketplace that strengthens local agri-food ecosystems by making fresh, local products easier to discover and purchase.

The next phase will focus on completing the remaining database-querying services, strengthening protection against prompt injection and other security risks, testing direct integration of the chatbot interface within the PrestaShop environment, and carrying out more comprehensive end-to-end validation of the overall solution.

1. Project Overview

Context and Rationale

The project is rooted in the need to ensure that ongoing digital transformation in agri-food markets does not further disadvantage small and medium-sized local producers.

In the Puglia region, for example, agriculture forms the backbone of the economy with over 260,000 active farms. However, small and medium producers face a highly fragmented short-food-supply-chain, relying on intermittent farmers' markets or generic online portals that lack personalization and end-to-end traceability. Simultaneously, urban consumers are increasingly demanding certified, organic, and locally sourced foods but struggle to discover options that align with their ethical values and dietary needs.

The project addresses this gap by developing an easy-to-use digital solution aimed at increasing the visibility of local producers and facilitating direct access by communities to fresh local products.

Alignment with the Call Objectives and Selected Pilot Region(s)

The project contributes directly to the overarching call objectives by directly supporting the Develop Call's goals for AI/GIS-driven innovation in Pilot 4. The selected pilot region is Puglia, specifically targeting the connection between the peri-urban agricultural hinterland and the urban demand concentrated in areas like the City of Foggia. By prototyping and progressively validating this digital middleware in a representative area, the project is expected to contribute to a scalable model for more resilient and inclusive short-food-supply chains in the region and, potentially, beyond.

Target Users and Stakeholders

The project involves a diverse ecosystem of users and stakeholders, consistent with a collaborative Multi-Actor Approach (MAA):

- **Rural Producers and Cooperatives:** Smallholders seeking a low-touch digital channel to increase sales volume and retain higher margins.
- **Urban Consumers:** City residents looking for an intuitive way to purchase tailored, traceable local food that matches their specific lifestyle preferences.
- **Municipal and Local Authorities:** Public entities invested in driving sustainable rural-urban development.
- **NGOs and Consumer Associations:** Groups that will co-define and ratify quality standards, such as organic certifications and anti-exploitation safeguards.
- **Urban Retail Partners:** Local shops and community hubs envisaged as potential sustainable pick-up points.

Short Description of the Solution / Service / Methodology

The core solution under development is the “Field2Fork AI Hub”, an AI-assisted middleware layer designed to operate on top of a PrestaShop-based E-Market for Local Food. Its main intended interface is an intelligent, conversational “Personal Farmer” chatbot designed to support users throughout the purchasing process. In its intended user flow, users can express dietary needs, allergies, and ethical preferences in free text, enabling the system to assist them in identifying relevant local fresh products in a more intuitive and personalized way.

The solution is being developed around a Retrieval-Augmented Generation (RAG) framework and database-querying services intended to support product discovery based on availability and structured product information. The target workflow foresees the generation of tailored shopping options, progressively to be ranked according to criteria such as cost, convenience, and sustainability-related considerations. Once a selection is confirmed, the system is designed to transfer the relevant product choices to the cart through its integration layer and to redirect the user toward the E-Market environment for checkout completion. At the current stage, the prototype already validates the core logic of

catalogue querying, cart-state handling, and checkout redirection, while further integration and testing activities will clarify the implementation of additional user-facing components and functionalities planned for the next phases.

2. Progress Against Objectives and Work Plan

Objective Description

The primary objective of the project is to develop the "Field2Fork AI Hub", an AI-assisted middleware layer centred on a conversational "Personal Farmer" interface for the local fresh produce market. At this stage, the project focuses on establishing and validating the technical foundations required for this solution, with particular attention to product discovery, cart-related logic, and integration with the existing PrestaShop-based e-commerce environment. The broader objective remains to improve the visibility of local agricultural producers and strengthen their connection with urban consumers through a more intuitive and personalised digital purchasing experience.

Work Plan Progress

Summary of Activities Carried Out: During the present reporting period, activities concentrated on foundational research, technical feasibility assessment, and initial prototype development.

The first phase of work focused on identifying and validating the most appropriate technology stack for the solution, leading to the selection of PrestaShop, MariaDB, Redis, and LangGraph/LangChain. Building on this foundation, the technical team developed a first working prototype in Python, specifically designed to interoperate with the existing PHP-based PrestaShop platform. In parallel, the AI chatbot was integrated into an external Streamlit-based interface to enable early interaction testing, and a first set of APIs was developed to connect the assistant with the available PrestaShop services.

Overall, these activities produced a functioning prototype that already validates key elements of the intended architecture, including catalogue querying, cart-state handling, and checkout redirection logic.

Reference to Planned Phases/Tasks: The activities carried out during the reporting period correspond primarily to **Phase 1 (Strategic Planning & Requirements Analysis – M1)** and **Phase 2 (Development & Integration – M2–M4)** of the original work plan. In line with Phase 1, work addressed initial alignment on objectives, API access requirements, and technical governance aspects. In line with Phase 2, the project progressed on the design and implementation of the core backend and on the prototyping of the main "Personal Farmer" components. At the same time, some elements originally foreseen within the broader development trajectory (such as deeper user-facing integration within the PrestaShop interface and subsequent user validation activities) remain part of the next implementation steps rather than completed outputs of the present reporting period.

Milestones and Deliverables Status: At mid-term, progress is consistent with the project's early development roadmap. The main technical milestone achieved so far is the delivery of an initial working prototype capable of interfacing with the existing e-market environment and validating the core interaction logic. The activities completed to date also support the expected outputs of the M1–M4 phases, particularly in relation to technical feasibility, prototype development, and integration groundwork. Deliverables and milestones associated with the later phases of the project (including integrated pilot deployment, structured user acceptance testing, broader stakeholder validation, and scale-readiness assessment) should be considered **ongoing or upcoming**, as they belong to the next implementation period. No critical delay affecting the overall project trajectory is currently evident from the technical progress achieved so far.

Deviations from the Work Plan and Corrective Actions

- **Description of the deviation:** The initial deployment of the AI chatbot interface was carried out through an external environment (Chainlit/Streamlit) rather than being embedded directly into the PrestaShop user interface from the outset.

- **Reason for the deviation (technical):** This adjustment was mainly driven by the technical heterogeneity of the solution stack. While PrestaShop is based on PHP, the AI and RAG-related components under development rely on Python libraries such as LangChain and LangGraph. Introducing an external interface at this stage allowed the team to validate the assistant's conversational logic, cart-generation workflow, and API connectivity more efficiently, without being slowed down by immediate front-end integration constraints within the production e-commerce environment.

- **Corrective action taken or planned:** The external interface has therefore been used as a practical baseline for rapid prototyping and early validation. In the next phase, the project will build on this baseline to assess the most suitable approach for integrating the chatbot messaging interface more directly within the PHP-based PrestaShop environment, while also completing the remaining database-querying services, strengthening security protections, and carrying out broader end-to-end testing.

- **Impact on objectives, timeline, or results:** At present, this technical deviation has not negatively affected the project's core objectives or overall timeline. On the contrary, it has enabled faster validation of the main architectural assumptions and supported the efficient development of the Python-based prototype and its integration logic. The deviation should therefore be understood as a technical adaptation aimed at de-risking implementation during the mid-term phase, rather than as a reduction in scope.

3. Technical Results and Outputs

Description of the developed and functioning prototype of the digital application, and any other tools, services, datasets, methodologies

The current technical result of the project is a functioning prototype of the Field2Fork AI Hub developed as an AI-assisted conversational layer connected to the existing PrestaShop-based e-market environment. The prototype is built around an agentic workflow implemented in Python using the LangGraph and LangChain libraries. At its core, the system consists of a configurable AI agent equipped with specialised tools that allow it to decide, according to the user's request and the conversation context, which action to execute at each step of the interaction.

At the present stage, the prototype includes three main operational tools. The first tool enables access to the live PrestaShop product catalogue through SQL queries executed against the underlying MariaDB database. This component retrieves product data and related metadata, including price, weight, nutritional values, dietary classifications, and stock availability, and forms the basis for the current product-matching logic. The second tool manages session-level cart metadata, ensuring that the latest cart state is preserved across interaction turns and that modifications performed during the conversation remain consistent with the e-commerce environment. The third tool finalises the selected cart and generates the redirect link to the PrestaShop checkout page, allowing the user to move from the AI-assisted interaction to the purchase completion stage.

The prototype is currently exposed through a Streamlit-based user interface connected to the assistant's backend API. This solution was adopted in the present development phase as a practical and effective frontend environment for rapid prototyping and early technical validation. In this sense, the current implementation demonstrates the feasibility of the core interaction flow from user request, to catalogue querying, to cart-state handling, and finally to checkout redirection.

In relation to the broader architecture described in the original proposal, the present prototype should be understood as a partial but functional implementation of the overall solution. The proposal foresees, in later phases, additional components such as dashboard-based presentation of multiple shopping options, broader analytics and feedback flows, routing-related features, and tighter integration with external PoliRuralPlus tools. These elements remain part of the target architecture and of the project roadmap, but they should not yet be presented as fully validated outputs of the current reporting period.

Technical maturity (e.g. prototype, pilot deployment, operational)

At mid-term, the technical maturity of the solution can be described as a functional prototype under early integration validation. The system already demonstrates a working architecture and supports core user-flow operations, but it is not yet at pilot deployment or operational stage. More specifically, the current reporting period corresponds to the project phase dedicated to modular prototyping and integration groundwork, while integrated demonstrator activities, structured user acceptance testing, and live pilot validation are planned for the following implementation phases.

This positioning is also consistent with the original TRL trajectory presented in the proposal, where the project starts from prototype-level components and reaches higher maturity only after user testing, integrated staging deployment, and scale-readiness validation. The current prototype therefore provides evidence of technical feasibility and initial end-to-end functionality, while further work is still required to achieve the more advanced maturity levels foreseen by the end of the project.

Screenshots, diagrams, links to demos or repositories (if public)

A high-level architecture diagram of the prototype flow is already included in this report as Figure 1, showing the main components of the current implementation and the overall interaction logic between the conversational assistant, the supporting tools, and the e-commerce environment.

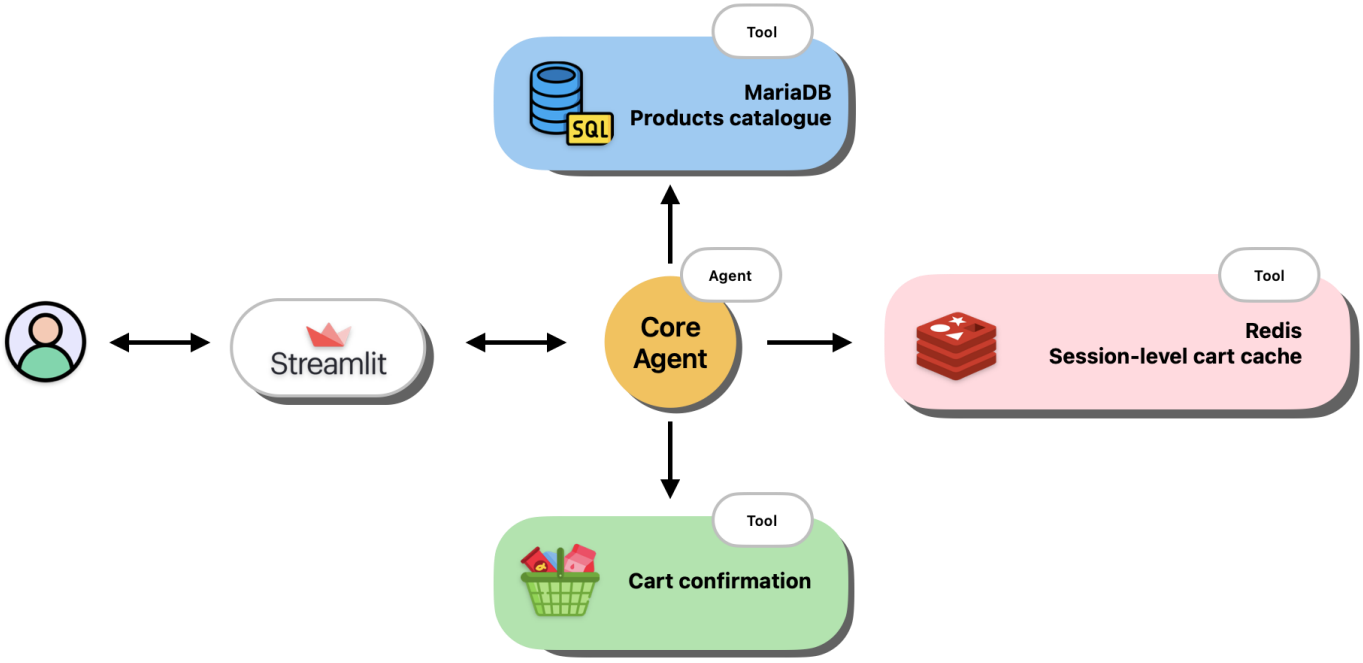

Figure 1 High-level flow architecture

At this stage, the prototype is accessible internally through the Streamlit-based interface used for development and validation. No public repository or public demo link is currently provided in the draft, and, given the public nature of this deliverable, it is appropriate to include only non-sensitive screenshots or diagrams that illustrate the architecture and the user flow without exposing internal endpoints, credentials, or implementation details.

Interoperability and standards used (if relevant)

Interoperability is a central design feature of the solution. The prototype has been developed to operate as a middleware layer on top of the existing PrestaShop-based e-market, without requiring changes to producer-side workflows. In its current form, interoperability is achieved through the interaction with the PrestaShop environment and its underlying data structures, including product catalogue information, cart-related metadata, and checkout redirection logic. The current implementation therefore already validates the core principle of an AI-assisted layer that can interact with an existing e-commerce infrastructure rather than replacing it.

From a technical standpoint, the current stack combines Python-based AI orchestration components, namely LangGraph and LangChain, with a PrestaShop environment based on PHP and a MariaDB backend. This cross-stack setup is one of the key technical features of the project and also explains the temporary use of an external Streamlit frontend for the prototype phase. At the same time, the proposal foresees broader interoperability through REST-style integration, possible embedding into the e-market interface, and future connections with PoliRuralPlus tools such as GeoAI and the Advisor through anonymised data flows. For the purposes of the mid-term report, however, these latter elements should be described as planned interoperability directions rather than as fully implemented outputs.

4. Integration and Contribution to PoliRuralPlus

Use of PoliRuralPlus tools, platforms, or data (if applicable)

Field2Fork AI Hub has been conceived and developed in alignment with the PoliRuralPlus digital ecosystem and with the specific objectives of the Italian pilot in Apulia, which focuses on strengthening short food supply chains and reinforcing rural–urban linkages through digital innovation. At the current stage, the project contributes to this ecosystem primarily through architectural compatibility and progressive technical integration. The solution is designed as an AI-assisted middleware layer connected to an existing e-market environment, while remaining compatible with the broader PoliRuralPlus logic of data-driven decision support, stakeholder collaboration, and reusable digital services.

In particular, the project is aligned with the PoliRuralPlus tool landscape in four main ways. First, it is conceptually and technically consistent with the role of Jackdaw as a GeoAI conversational environment, since Field2Fork also relies on AI-assisted querying and structured retrieval mechanisms to support decision-making. Second, the project is relevant to the PoliRuralPlus Advisor perspective, as the data generated through user interactions can later support a better understanding of local demand patterns and inform more evidence-based regional action planning. Third, the project is compatible with the Multi-Actor Approach promoted by PoliRuralPlus and is intended to connect with related stakeholder-engagement workflows in the next implementation phases. Fourth, the overall design follows the Develop Call expectation that funded projects should produce practical digital applications that can interoperate with PoliRuralPlus tools and contribute data back into the wider project ecosystem.

At mid-term, the practical use of PoliRuralPlus tools should therefore be described as partially established and progressively developing. The current prototype validates the core digital logic of the solution, while the fuller operational interaction with PoliRuralPlus services and data flows will be strengthened during the subsequent implementation and pilot-validation phases.

Data generated, their integration into PoliRuralPlus and how it contributes to the wider ecosystem

Even at the current prototype stage, Field2Fork AI Hub generates data that are relevant for the wider PoliRuralPlus ecosystem. These include structured records of product queries, user preference expressions, product-selection patterns, cart-composition events, and interaction flows between conversational requests and e-market actions. As the project moves into later implementation stages, these datasets may be complemented by additional anonymised information on user choices, routing preferences, and behavioural patterns related to access to local food products.

The strategic value of these data lies in their ability to connect consumer-side interaction signals with territorial and governance-oriented intelligence. Within the PoliRuralPlus framework, such data can contribute to a better understanding of how rural supply and urban demand interact in practice, especially in the context of short food supply chains. In operational terms, the project is designed so that anonymised and aggregated outputs can later be made available to PoliRuralPlus tools such as Jackdaw and the Advisor, in order to enrich spatially contextualised

analysis, support demand-oriented interpretation, and contribute to evidence-based reflection on regional action priorities.

At mid-term, it is important to stress that this integration contribution is already embedded in the project logic, but is not yet fully realised as a complete production data pipeline. The current reporting period has mainly focused on validating the technical feasibility of the core system and the quality of the interaction flow. The next phases will be the appropriate stage for consolidating the export, structuring, and reuse of selected anonymised datasets within the broader PoliRuralPlus environment.

Synergies with other projects or initiatives

Field2Fork AI Hub is strongly coherent with the wider strategic orientation of PoliRuralPlus in Apulia, where ongoing activities already focus on short food supply chains, stakeholder engagement, and the strengthening of rural–urban relations. In this respect, the project does not stand as an isolated digital application, but rather as a complementary implementation effort that can provide a practical, user-facing technological layer for themes already being explored in the Italian pilot. This creates a natural synergy with previous and parallel PoliRuralPlus actions in the region aimed at understanding stakeholder needs, promoting innovative short food supply chain models, and reinforcing dialogue between producers, consumers, researchers, and local institutions.

More broadly, the project also shows thematic continuity with the wider PoliRuralPlus emphasis on FAIR data, AI-supported rural–urban innovation, and New European Bauhaus values. Its focus on local food access, user-centred interaction, and sustainable rural–urban connectivity places it in a position to complement other initiatives working on digital agriculture, local marketplaces, territorial data use, and participatory governance. In this sense, Field2Fork can contribute not only as a single prototype, but also as an example of how AI-enabled middleware can be applied in concrete regional food-system contexts while remaining linked to larger policy and innovation frameworks.

At this stage, these synergies are mainly strategic and methodological rather than formalised through fully developed cross-project workflows. However, the project already positions itself as a useful bridge between technical experimentation, stakeholder-centred local action, and the broader PoliRuralPlus ambition to generate transferable rural–urban innovation models.

Reusability and interoperability aspects

Reusability and interoperability are central features of the Field2Fork AI Hub approach. From a technical perspective, the solution has been designed as a middleware layer rather than as a closed standalone platform. This means that its logic can, in principle, be adapted to other e-commerce or marketplace environments with similar structures, especially where product catalogues, cart logic, and checkout flows can be accessed through APIs, database services, or equivalent integration mechanisms. The current implementation already validates this principle by operating on top of an existing PrestaShop-based environment without requiring disruptive changes to producer-side workflows.

The project also presents reusable methodological aspects. Its combination of conversational AI, structured product retrieval, cart-state orchestration, and later-stage analytics generation offers a modular framework that could be adapted to other regional contexts in which local producers need better digital visibility and consumers need more intuitive access to local products. This modularity is consistent with the PoliRuralPlus expectation that funded projects should generate transferable approaches, documentation, and integration logic that can be reused beyond the original pilot setting.

At mid-term, interoperability should be described as partially demonstrated and technically promising. The prototype already confirms interoperability with the target e-market environment and with the underlying product and cart data structures. Broader reusability across the PoliRuralPlus ecosystem and across other regions will depend on the completion of the remaining integration work, the consolidation of documentation, and the validation of the

application under more realistic pilot conditions. Nevertheless, the project already provides a credible basis for future replication because its architecture is modular, its integration logic is not tied to a single user interface, and its outputs are intended to be documented in a form that supports reuse.

Long-term contribution and reuse

In the longer term, Field2Fork AI Hub is expected to contribute to PoliRuralPlus not only as a single pilot application, but as a reusable digital pattern for connecting AI-enabled consumer interaction with rural–urban development goals. Its long-term contribution lies in demonstrating how a lightweight conversational middleware can increase the accessibility of local food systems, generate useful behavioural and market intelligence, and support stronger links between local producers, consumers, and territorial governance processes.

If the later implementation phases confirm the robustness of the prototype under pilot conditions, the project could provide a practical reference model for similar short food supply chain contexts in other regions. Its future reuse potential is strengthened by three factors: the modular nature of the architecture, the possibility of documenting the integration logic through technical specifications and implementation guidance, and the compatibility of its generated data with wider PoliRuralPlus analytical and governance-oriented tools. For these reasons, the project's long-term value should be seen not only in the direct functionality of the Field2Fork application itself, but also in its capacity to inform replication, adaptation, and further experimentation within and beyond the PoliRuralPlus framework.

5. Stakeholder Engagement and User Involvement

Description of stakeholder engagement activities

During the reporting period, the partners DARe S.c.a.r.l. and EXO S.r.l. initiated stakeholder-engagement activities as listening and co-design actions aimed at collecting concrete inputs for the development of the Field2Fork AI Hub solution. At this stage, the engagement process focused primarily on local producers operating in the province of Foggia, identified as relevant actors for the forthcoming pilot-oriented validation phase. This first activity should therefore be understood as an initial step toward a broader stakeholder-engagement pathway that, in the next phases, will progressively involve additional actors, including end users and consumers.

In this context, **DARe** and **EXO** organised an initial **co-design and listening session** involving local agri-food producers. The meeting took place on **18 February 2026** at Masseria De Vargas in Foggia, a location selected for its relevance within the local short supply chain ecosystem. The hosting context was particularly suitable because it already functions as a connection point between a group of producers and a broader community of consumers, thus providing a meaningful setting for discussing the practical conditions under which the proposed digital solution could be adopted.

The participants represented different segments of the **local agri-food system**, including producers of citrus fruits, pasta, honey, legumes, olive oil, and traditional preserved products. Their involvement provided an initial basis for grounding the project in the operational realities of small-scale production and for preparing the subsequent pilot-oriented activities in the Foggia area.

Engagement methods (workshops, pilots, interviews, testing, etc.)

The engagement activity was organised in the form of a **focus group**, used as a qualitative method for collecting structured feedback and exploring practical expectations related to the future platform. The session was moderated and designed to encourage open discussion around the proposed AI-supported digital application, its intended functions, and the conditions necessary for its effective use in the local context.

The meeting was structured in **three main moments**. First, the project team introduced the initiative, its connection to the PoliRuralPlus framework, and the general concept of an AI-supported digital environment aimed at facilitating

interaction between local producers and urban consumers. Second, participants were invited to discuss the feasibility and usefulness of the proposed solution, with particular attention to the real operating conditions of small-scale producers. Third, the session concluded with a synthesis of the main points raised and with an initial discussion of the next project steps, including future validation of the prototype with stakeholders.

This engagement method proved useful at the current stage because it made it possible to collect **early qualitative evidence**, identify **operational constraints**, and begin shaping the **validation pathway** for the next implementation phase. It also helped establish an **initial stakeholder base** for the upcoming pilot activities in the territory of Foggia.

Feedback received and how it influenced the work

The feedback collected during the focus group provided several useful indications for the refinement of the solution.

A first key point concerned the **importance of trust, storytelling, and product identity**. Participants stressed that small producers create value not only through the product itself, but also through the narrative surrounding its origin, production methods, and territorial context. This suggests that the platform should support not only transactional functions, but also richer product presentation and contextual information capable of reinforcing consumer trust and product differentiation.

A second important issue concerned **logistics**. Participants highlighted that fragmented on-demand delivery can represent a major challenge for small producers, who often lack the resources to manage highly flexible distribution patterns. This feedback confirmed the importance of considering organisational models based on aggregation, scheduled delivery windows, and shared pick-up points when designing the next phases of the solution.

A third insight related to the **distinction between product categories**. Stakeholders noted that fresh and perishable goods require different handling conditions from more stable products such as pasta, honey, wine, or preserves. This has implications for how the platform should structure product availability, delivery timing, and related user information.

The discussion also confirmed the perceived value of the **conversational assistant as a decision-support tool**. Participants recognised that a chatbot-based interface could offer added value compared with a conventional online marketplace, especially if it can guide users through personalised choices based on dietary preferences, budget, household needs, and sustainability-related considerations. At the same time, concerns were raised regarding fairness in product recommendation and visibility, indicating the need to ensure that the platform does not unintentionally disadvantage certain producers through overly narrow recommendation criteria.

Overall, the feedback collected has already influenced the project by reinforcing the **need for a user-centred** and **operationally grounded design approach**. It has also provided concrete directions for the next development phase, particularly with regard to product presentation, logistics, recommendation logic, and future user testing.

Evidence of user uptake or interest

At this stage, evidence of uptake should be understood primarily in qualitative terms. The focus group demonstrated a **concrete level of interest among local producers** in the possibility of testing a digital solution capable of improving product visibility and facilitating better matching between local supply and urban demand. Participants showed willingness to engage with the project not only as consultees, but also as potential contributors to the next validation phase.

This early interest is particularly relevant because it suggests that the project is addressing a recognised need within the local ecosystem. At the same time, the discussion made clear that future adoption will depend on the platform's ability to respond to **real operational conditions**, including logistics, seasonality, trust-building, and fair product visibility. In this sense, the engagement process has not only confirmed stakeholder interest, but has also helped clarify the conditions under which that interest may translate into actual use during the pilot phase.

6. Communication, Dissemination and Visibility

Media outputs and dissemination activities

During the reporting period, a first set of communication and dissemination activities was carried out to introduce the Field2Fork AI Hub project and raise awareness among relevant stakeholders. These activities were primarily aimed at **informing local actors** about the project's objectives, presenting its connection with the PoliRuralPlus framework, and **encouraging early participation** in the stakeholder-engagement process.

A first dissemination line consisted of **direct outreach to relevant stakeholders**, especially local producers, through invitation emails and follow-up contacts aimed at supporting participation in the initial focus group. This direct communication was important for ensuring the involvement of actors with practical relevance to the project's future pilot phase.

A second dissemination line consisted of **publications on the institutional websites** of the project partners. These articles presented the initiative, explained its rationale, and highlighted the expected contribution of artificial intelligence to the strengthening of short food supply chains in the regional context. In parallel, the project was also promoted through **institutional social media channels**, including Facebook and LinkedIn, in order to increase visibility and reach a broader audience.

More specifically, the following articles were published on the institutional websites of the project partners:

1. https://darepuglia.it/field2fork-ai-hub-lintelligenza-artificiale-al-servizio-della-filiera-corta-in-puglia/
2. https://exo-ricerca.it/blog/2026/01/05/field2fork-ai-hub-poliruralplus/
3. https://exo-ricerca.it/blog/2026/02/02/nasce-field2fork-ai-hub-la-filiera-corta-a-portata-di-clic/

An additional relevant visibility action was the **stakeholder event held on 18 February 2026** at Masseria De Vargas in Foggia. This event served both as an engagement activity and as an initial public-facing moment for the project, helping to make the initiative visible within the local ecosystem and to create an early basis for the forthcoming pilot-oriented phase.

It should also be remarked that all photos and visual materials during the meeting were collected in compliance with GDPR requirements, and participants were informed about the purpose of the documentation.

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Compliance with EU funding visibility requirements

The communication materials produced so far have been prepared with attention to the visibility requirements associated with the PoliRuralPlus and EU funding framework. In particular, dissemination outputs have included references to the project context, acknowledgement of the relevant funding framework, and the use of visual identity elements where appropriate.

This aspect will remain important throughout the following phases of the project. Future communication and dissemination materials will continue to ensure the appropriate use of acknowledgement statements, project branding, and funding references, in line with the requirements applicable to publicly visible project outputs.

Overview of dissemination progress at mid-term

At mid-term, dissemination activities should be considered as initiated and progressively developing. The communication work carried out so far has been functional to the early stage of the project: it has supported awareness raising, stakeholder mobilisation, and the first public presentation of the initiative. While the current reporting period has not yet generated a large volume of dissemination outputs, it has established the basic communication channels and visibility mechanisms necessary for the next implementation phase.

As the project advances toward pilot validation and broader stakeholder involvement, dissemination is expected to become more structured and more closely linked to demonstrable results, user feedback, and territorial experimentation. The final report will therefore be able to provide a more complete overview of communication outputs, including stakeholder events, online publications, social media dissemination, visual documentation, and other materials produced during the later stages of implementation.

7. Impact Assessment

Expected impacts

At this stage, the expected impacts of Field2Fork AI Hub remain closely aligned with the original project rationale and with the wider objectives of strengthening short food supply chains in the Apulia pilot area. The project is expected to improve the visibility of local producers by making their products easier to discover through a more intuitive and personalised digital interaction model. In parallel, it is expected to facilitate access for urban consumers to fresh local produce that better matches their dietary preferences, ethical concerns, and purchasing needs.

Beyond the immediate user-facing dimension, the project is also expected to generate broader territorial value. By improving the connection between supply and demand in local food markets, the solution has the potential to support more resilient rural–urban linkages, strengthen local economic circulation, and reduce some of the inefficiencies that characterise fragmented short supply chains. In its fuller implementation, the project is also expected to contribute to better-informed governance and planning processes through the generation of aggregated behavioural and market-related insights.

At the same time, the stakeholder feedback collected so far suggests that these impacts will depend not only on the technical performance of the application, but also on its capacity to reflect the operational realities of local agri-food systems. In particular, the expected benefits will be stronger if the solution can incorporate product storytelling, fair visibility among producers, differentiated handling of fresh and non-perishable goods, and logistics models that are workable for small-scale operators.

Early signals of impact

Although the project is still at prototype stage, some early signals of impact are already visible. First, the successful development of a functioning prototype confirms that the core technical concept is feasible and that a conversational AI layer can effectively interact with the existing PrestaShop-based e-market environment. This is an important early signal because it validates the main assumptions behind the project and reduces implementation uncertainty for the next phases.

Second, the work completed so far indicates a credible pathway toward the intended user experience. The prototype already demonstrates the essential sequence from user request to product discovery, cart-state handling, and redirection to checkout. Even though user testing is still to be conducted in a more structured way, this progress suggests that the solution has concrete potential to simplify product access and improve digital usability in the local fresh produce market.

Third, a first stakeholder-engagement activity has already produced relevant qualitative evidence. The focus group held in Foggia showed a positive orientation among local producers toward the proposed experimentation and confirmed that the project addresses a recognised need within the local short supply chain ecosystem. The discussion also helped clarify the practical conditions that will influence future adoption, particularly with regard to logistics, seasonality, trust, recommendation fairness, and the communication of product identity.

Fourth, the project has already generated an initial basis for future data-driven impact. The interaction logic and prototype architecture show that the solution can produce structured information on user queries, product preferences, and cart-composition patterns. While these data are not yet being exploited at scale, they represent an early indication of the project's capacity to support wider ecosystem learning and future policy-relevant insights.

Qualitative indicators (interest, adoption potential)

At mid-term, the most appropriate indicators are qualitative rather than fully outcome-based. A first qualitative indicator is the maturity of the prototype itself: the existence of a working system capable of handling catalogue queries, preserving cart consistency, and supporting checkout redirection suggests a realistic adoption pathway rather than a purely conceptual solution.

A second qualitative indicator is the positive initial response received from local producers involved in the first focus group in Foggia. Their willingness to discuss the platform, contribute operational feedback, and remain involved in the next validation steps indicates a meaningful level of early interest. This is particularly relevant because it comes from actors who are directly exposed to the organisational constraints that the platform is intended to address.

A third qualitative indicator is the relevance of the identified problem-solution fit. The project addresses a clearly recognised gap between fragmented local food supply and increasingly personalised consumer demand. This gives the solution a credible adoption potential, especially in contexts where local producers lack advanced digital channels and consumers require more guided access to traceable and preference-sensitive food choices.

A fourth qualitative indicator is the modularity of the technical approach. Because the solution is being developed as a middleware layer rather than as a fully closed platform, it shows potential for adaptation and reuse beyond the immediate prototype context. This increases the likelihood that the project may generate value not only as a local pilot application, but also as a transferable model for similar short food supply chain settings.

At the same time, the stakeholder feedback collected so far suggests that adoption potential remains conditional. Future uptake will depend on the platform's ability to respond credibly to practical requirements such as flexible logistics, differentiated treatment of fresh and non-perishable products, fairness in recommendation logic, effective storytelling, and communication approaches capable of engaging also younger consumers. At this stage, these indicators should therefore be understood as early signs of interest and adoption potential, not yet as evidence of achieved impact.

8. Challenges, Risks and Lessons Learned

Key challenges encountered

The main challenge encountered during the reporting period has been the technical complexity of integrating advanced AI components with an existing e-commerce environment based on a different technology stack. While the conversational and RAG-related components were developed in Python, the target marketplace environment is based on PrestaShop and therefore relies on PHP-based structures and workflows. This created an integration challenge, particularly in relation to how quickly the assistant interface could be embedded directly into the production-facing user environment.

A second challenge concerns the progressive nature of the system architecture itself. The project does not consist of a single isolated application, but of several interacting components, including product retrieval logic, cart-state management, and checkout redirection. Ensuring consistency across these elements, especially in a conversational setting where actions may unfold over multiple turns, required careful design decisions and iterative validation.

A third challenge emerged more clearly through the first stakeholder-engagement activity. The focus group with producers confirmed that technical innovation alone will not be sufficient to ensure adoption. In particular, logistics represent a major operational bottleneck for small-scale producers, especially where on-demand delivery models would create fragmented distribution burdens. This means that the project must not only develop a technically functional application, but also ensure that the proposed user flow remains compatible with realistic delivery and pick-up arrangements.

A fourth challenge concerns the heterogeneity of product categories and user expectations. The discussion with stakeholders highlighted that fresh and perishable goods require different handling conditions from non-perishable products, and that recommendation logic must avoid over-simplified criteria that could disadvantage certain producers. In addition, the project must be able to communicate value in a way that supports trust, product identity, and possible future engagement of younger consumers.

Risk mitigation actions

The main mitigation action adopted during the reporting period was the use of an external Streamlit-based interface as a practical frontend environment for prototyping and early validation. This approach allowed the team to test the assistant's core logic, API interactions, and user flow without being delayed by the additional complexity of direct UI embedding into the PrestaShop environment. In this sense, the chosen setup acted as a de-risking strategy that supported faster technical learning while preserving the possibility of tighter integration in the next phase.

A second mitigation action has been the prioritisation of core functions over secondary features. The development effort focused first on the components that were most essential for validating the project concept: catalogue querying, cart-state handling, and checkout redirection. This has made it possible to establish a stable baseline architecture before extending the solution toward more advanced or user-facing functionalities.

A third mitigation action, already initiated, has been the activation of an early stakeholder-listening process. The focus group in Foggia allowed the project team to identify operational risks before entering the broader pilot phase, particularly in relation to logistics, seasonality, product differentiation, recommendation fairness, and communication needs. This early feedback has reduced the risk of pursuing a purely technology-driven design disconnected from real stakeholder conditions.

A further mitigation priority for the next stage is the strengthening of system robustness and security. In particular, the project has already identified the need to complete the remaining database-querying services, improve the integration layer, and implement protections against risks such as prompt injection and unreliable conversational behaviour. These actions are important not only for technical quality, but also for preparing the solution for broader testing and user-facing validation.

Lessons learned (technical, organisational, stakeholder-related)

From a technical perspective, the main lesson learned is that early validation through a simplified but functional interface can be more effective than attempting full-stack integration too early. In the present case, separating prototype validation from final interface embedding has allowed the team to verify the feasibility of the core architecture more quickly and with less implementation risk.

From an organisational perspective, the project has shown the importance of sequencing work in a way that balances ambition and feasibility. The original proposal presents a broad and innovative architecture, but the mid-term experience confirms that such a solution needs to be built through successive layers of validation. Establishing a stable core prototype before moving to richer integrations and wider pilot functions appears to be the right approach for maintaining delivery realism.

From a stakeholder-related perspective, an important lesson is that adoption will depend not only on technical performance, but also on usability, trust, and clarity of value for different actor groups. The first focus group showed clearly that producers attach strong importance to storytelling, product identity, and fair visibility within the platform. This means that the application must be perceived not simply as an ordering tool, but as an environment capable of representing the quality and specificity of local products in a credible way.

A further lesson concerns the operational relevance of logistics and product differentiation. The project has learned that user uptake will depend on the extent to which the platform can accommodate different fulfilment conditions for fresh and non-perishable goods, while supporting organisational models that are workable for small producers. In addition, the discussion highlighted that future scalability may depend on the ability to adapt the communication style and user interface to audiences beyond the already motivated users typically engaged in local food initiatives, including younger consumers.

At mid-term, these lessons should be seen as constructive learning outcomes that strengthen the implementation pathway. They also provide a useful basis for refining the project’s priorities in the remaining phases.

9. Sustainability, Replicability and Next Steps

Planned next steps

The next phase of the project will focus on consolidating the prototype developed during the present reporting period and advancing it toward a pilot-oriented validation stage. A first priority will be the completion of the remaining database-querying and service-integration components required to make the assistant’s interaction with the e-market environment more complete, stable, and reliable. In parallel, the project will strengthen system robustness through additional backend refinement and the implementation of essential protections against security and conversational risks, including prompt-injection vulnerabilities.

A second priority will be to assess the most suitable approach for tighter integration between the chatbot interface and the PHP-based PrestaShop environment. While the current Streamlit-based interface has proved effective for rapid prototyping and early technical validation, the next implementation stage will need to clarify how the

conversational layer can be embedded more directly into the target user environment while preserving stability and usability.

A third priority will be the implementation of a pilot-oriented validation phase in the territory of the city of Foggia, aimed at verifying the usability of the solution in a real territorial context. This next stage will build on the stakeholder-engagement activity already initiated through the first producer-focused focus group and will progressively extend validation to a broader set of actors, including additional stakeholders and end users, among them consumers. The purpose of this phase will be to move beyond internal technical validation and collect direct evidence on usability, clarity of interaction, operational feasibility, and overall suitability of the solution under more realistic conditions.

Particular attention will be given to the practical issues that emerged from the initial stakeholder feedback. These include logistics organisation, treatment of different product categories, recommendation fairness, storytelling and trust-building, and the communication choices needed to make the solution attractive to wider user groups. In this sense, the next phase will not only test whether the prototype works technically, but also whether it can be refined into a tool that is operationally credible for producers and understandable for final users.

In line with the original work plan, this pilot-oriented phase will support broader technical and user-centred validation. It will make it possible to assess the end-to-end flow of the solution, from natural-language product discovery to cart transfer and checkout, while also gathering structured feedback from users and stakeholders in order to refine the application before the later stages of project implementation.

Adjustments to the work plan

At mid-term, the main adjustment to the work plan concerns the implementation pathway rather than the strategic direction of the project. The core objectives remain unchanged, but the sequence of technical development has been adapted to reflect the practical challenges of integrating Python-based AI components with a PHP-based e-commerce environment. For this reason, the project has prioritised external prototyping and backend validation before direct embedding of the conversational interface into the PrestaShop user interface.

At the same time, the validation pathway is now defined more concretely on the basis of the first stakeholder-engagement results. A first producer-focused activity has already been carried out in Foggia, and the next implementation steps will build on this basis to organise a broader pilot-oriented usability validation involving additional stakeholders and, progressively, end users including consumers. This should not be interpreted as a change in the project's rationale, but rather as a more operationally grounded specification of how the planned validation phase will be implemented in practice.

These adjustments should therefore be understood as pragmatic refinements aimed at reducing implementation risk and strengthening the quality of the next phase. At present, they do not appear to compromise the overall project trajectory. On the contrary, they contribute to a more realistic and territorially grounded development pathway, better aligned with both technical constraints and stakeholder feedback.

10. Conclusions

Overall assessment of the project

At mid-term, Field2Fork AI Hub can be assessed as a technically credible and strategically coherent project that has made meaningful progress toward its original objectives. Although the project has not yet reached the full level of

integration and validation foreseen for the final stages, the work completed so far has successfully established the technical foundations of the solution and demonstrated the feasibility of its core concept.

The reporting period should therefore be understood as a foundational phase focused on architecture definition, prototype development, and early technical validation. At the same time, the project has also begun to activate its territorial and stakeholder dimension through a first focus group with local producers in Foggia and through initial communication and dissemination actions. This gives the next implementation stage a clearer operational trajectory and strengthens the basis for the forthcoming pilot-oriented validation phase.

Key achievements

The main achievement of the reporting period is the development of an initial working prototype of the Field2Fork AI Hub. This prototype already demonstrates the essential interaction sequence between user request, product catalogue querying, cart-state handling, and checkout redirection, showing that the project has moved beyond concept definition into concrete technical implementation.

A second key achievement is the successful identification and validation of the main technology stack required to support the solution, including PrestaShop, MariaDB, Redis, and LangGraph/LangChain. This has clarified the architecture of the project and provided a robust basis for subsequent development.

A third important achievement is the adoption of a practical prototyping strategy that enabled efficient progress despite cross-stack integration challenges. By using an external Streamlit-based interface for early testing, the project was able to validate the assistant's core logic and integration behaviour while reducing implementation risk and preserving flexibility for future interface embedding.

A further relevant achievement is the launch of the stakeholder-engagement process through an initial focus group with local producers in the Foggia area. This activity produced useful operational feedback on logistics, product presentation, recommendation fairness, and user expectations, and it created an initial basis for the next phase of pilot-oriented validation.

Another relevant achievement is the activation of the project's first dissemination and visibility actions, including stakeholder outreach, website publications, social media communication, and the first public-facing event linked to the project. Although still limited in scale, these actions have already contributed to making the initiative visible within the local ecosystem and to supporting the engagement process.

Strategic value of the results

The strategic value of the results achieved so far lies in the fact that they demonstrate a realistic pathway for applying conversational AI to short food supply chains in a rural–urban development context. The project has already shown that an AI-assisted middleware layer can interact with an existing e-commerce infrastructure and support a more guided, personalised, and user-centred purchasing journey for local fresh products.

This is strategically relevant because it addresses a concrete territorial and market need: improving the visibility of local producers while making local food access easier and more intuitive for urban consumers. At the same time, the first stakeholder-engagement activity has shown that the project is not advancing only as a technical prototype, but also as a solution that is progressively being confronted with real operational conditions in the local agri-food ecosystem.

The fact that the next phase will include a broader pilot-oriented usability validation in Foggia further strengthens this strategic value. It will allow the project to test its solution not only in technical terms, but also in relation to stakeholder expectations, organisational feasibility, and potential user adoption in a defined territorial setting.

Overall, the mid-term results should be considered a strong enabling milestone. They do not yet represent the full impact anticipated by the project, but they provide credible evidence that Field2Fork AI Hub is on a sound technical and strategic trajectory, with solid prospects for further integration, pilot validation, and broader territorial relevance.