POLIRURAL plus

ENHANCE CALL

Financial Support for Third Parties

Final Report
Part A (Public)

Enhanced MooFind JackDaw Intelligence(eMooJI)

PoliRuralPlus has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101136910.

Funded by the European Union

Project title	***enhanced MooFind JackDaw Intelligence***
Project short name	*eMooJI*
Country / Region	*Germany*
Organisation	*MooFind*
Author(s)	*Roger Sánchez Güell, Jeet Biswas*
Submission date	*31.08.2026*
Version	*2.0*

Table of Contents

Executive Summary

Enhanced MooFind JackDaw Intelligence (eMooJI) was a six-month project implemented by MooFind under the PoliRuralPlus ENHANCE Call. Its purpose was to apply, test and assess the JackDaw GeoAI ecosystem in practical agricultural, land-management and rural-planning contexts.

The project addressed a common barrier to the use of spatial information in rural areas: many farmers and rural stakeholders do not have the time, specialist knowledge or software required to work directly with complex geographic information systems. eMooJI therefore explored whether spatial information could be made easier to access through natural-language and voice-based interaction.

MooFind developed a progressive web application connected to the consortium-hosted JackDaw agent through the JackDaw API. The application included text and voice input, polygon-based Area of Interest selection, multilingual interaction, dark mode, and functions to save and export conversations. It used the preconfigured MCP services available within the PoliRuralPlus ecosystem and also demonstrated that an external MooFind MCP server could be connected.

The project was validated in three European regions: Hesse in Germany, Aberdeenshire in Scotland and Catalonia in Spain. Stakeholders were engaged through one-to-one in-person meetings, online demonstrations and independent testing. Participants included farmers, agricultural and land-management actors, rural organisations, advisors, researchers and other users interested in spatial information.

Testing focused on practical questions related to vegetation and pasture conditions, grazing suitability, terrain, land use, protected areas, environmental restrictions and rural planning. Stakeholders generally valued the possibility of asking questions in simple language without using complex GIS tools. Voice interaction was considered particularly relevant for farmers and other users working in the field.

The validation also identified important limitations. These included slow response times and occasional timeouts, inconsistent handling of some polygon-based queries, answers that were sometimes too long, limited support for highly specific regional questions and insufficient explanation of underlying data sources. The results indicate that the solution is a promising and functional pilot, but further development is needed before it can support routine operational decision-making.

The main project outputs include the public eMooJI application, an open-source repository, a freely accessible question bank, user-support materials, stakeholder feedback, technical validation findings and recommendations for future development. Required communication outputs, including blog posts, social-media content and a news article, were also completed.

Overall, eMooJI demonstrated the potential of combining conversational AI, spatial services and MCP-based interoperability within existing rural digital platforms. Its strategic value lies in providing a reusable approach through which farmers and rural stakeholders can access spatial information more easily, while region-specific datasets and services can be added modularly in future. The project therefore contributes practical evidence, reusable outputs and lessons for the continued development of JackDaw and the wider PoliRuralPlus ecosystem.

1. Project Overview

Enhanced MooFind JackDaw Intelligence (eMooJI) was a six-month validation project implemented by MooFind under the PoliRuralPlus ENHANCE Call. The project addressed a practical challenge in rural digitalisation: farmers, land managers and rural organisations increasingly depend on spatial and environmental information, but many potential users do not have the time, technical knowledge or specialised software required to work directly with geographic information systems.

The ENHANCE Call supported projects that applied, tested and improved JackDaw, the PoliRuralPlus GeoAI chatbot, in real use cases. Projects were expected to engage local stakeholders, assess what worked and what was missing, and produce practical results and lessons that could be transferred to other regions and initiatives. eMooJI aligned with these objectives by applying JackDaw in agricultural, livestock-management, landscape-conservation and rural-planning contexts.
The selected use cases focused on questions for which users normally need to consult maps, satellite information or several separate data sources. Examples included, assessing vegetation and pasture conditions; identifying areas suitable for grazing; understanding terrain and slope; checking whether land overlaps with Natura 2000 or other protected areas; exploring land use and environmental restrictions; supporting pasture, landscape and rural-planning activities.

The project was designed around three European validation regions: Hesse in Germany, Aberdeenshire in Scotland and Catalonia in Spain. These regions offered different farming systems, landscapes, climatic conditions and stakeholder profiles, allowing the project to examine whether the same conversational approach could be relevant in different rural contexts.

The main target users were livestock farmers and farm managers, who make practical decisions related to grazing, pasture conditions and herd management, as well as regional and environmental organisations that use spatial information for land-use monitoring, landscape management and biodiversity-related activities. Other participants included agricultural advisors, researchers, rural-development actors and stakeholders interested in environmental and territorial information.

JackDaw played the central technical role in the project. It allowed users to ask natural-language questions and access information from connected spatial datasets and services. The aim was not to replace specialist analysis, but to test whether a conversational interface could make spatial information easier to access, understand and discuss, particularly for users who do not regularly work with GIS tools.

To support this validation, MooFind developed the eMooJI progressive web application. The application did not host a separate AI model; it connected to the consortium-hosted JackDaw agent through the JackDaw API. eMooJI provided a simplified user interface with text and voice input, polygon-based Area of Interest selection, multilingual interaction, dark mode, and functions to save and export conversations. The platform used the MCP-based services available within the PoliRuralPlus ecosystem and also demonstrated the connection of an external MooFind MCP server.

The project combined technical integration, internal testing and direct stakeholder validation. Participants were introduced to the platform individually, either in person or online, and tested questions related to their activities or areas of interest. Their feedback was used to assess usability, response quality, reliability, accessibility and practical relevance.

Overall, eMooJI provided a functional pilot through which the JackDaw ecosystem could be tested with rural users in three regions. The project produced a public-facing application, a reusable question bank, validation findings, recommendations and an open-source implementation that can support future development and regional adaptation.

2. Progress Against Objectives and Work Plan

The approved objective of eMooJI was to apply, test and evaluate the JackDaw GeoAI ecosystem in practical agricultural and land-management contexts, in line with the PoliRuralPlus ENHANCE Call. The project aimed to assess usability, reliability, accessibility, output quality and potential value for farmers, land managers, rural organisations, researchers and advisors. Validation was planned in Hesse, Aberdeenshire and Catalonia. Expected outputs included practical use cases, a question bank, onboarding materials, stakeholder validation, recommendations for JackDaw, dissemination outputs and a final report.

Implementation broadly followed the planned sequence: technical setup, preparation of use cases and materials, internal testing, stakeholder validation, feedback analysis, iteration and reporting. The work was organised across five work packages.

WP1 covered project coordination, task management, communication with the PoliRuralPlus team, monitoring and reporting. The team participated in technical sessions, reviewed training material and contacted the JackDaw developers when clarification was required. Coordination continued throughout the six-month period.

WP2 focused on understanding the JackDaw API and MCP architecture, defining use cases, preparing questions and developing user-support materials. Use cases covered vegetation and pasture conditions, grazing suitability, terrain, land use, protected areas and rural planning. A reusable question bank, multilingual guidance, a video tutorial and a feedback form were prepared. This phase required more time than expected because MCP integration was new to the team. During WP2, MooFind also developed the eMooJI progressive web application as a user-friendly interface connected to the consortium-hosted JackDaw agent. It included text and voice input, polygon-based Area of Interest selection, multilingual interaction, dark mode and chat-saving and export functions. This was an implementation refinement rather than a change in scope, as it improved accessibility and strengthened the planned validation.

WP3 covered stakeholder engagement and testing. The approved proposal anticipated regional group workshops, but validation was instead carried out through one-to-one sessions. Some participants were met in person, while others joined online demonstrations or tested the platform independently. This approach allowed explanations and test questions to be adapted to each participant’s role, digital experience and area of interest. Feedback was collected through observation, conversations, forms, emails and telephone follow-ups.

The project engaged 16 participants, below the planned 25 stakeholders and the target of 20 complete validation responses. All three regions were represented; however, Scotland had 3 participants, below the planned minimum of 5 responses per region, while Germany and Spain exceeded that threshold. Female participation reached 68.7%, substantially surpassing the target of at least 30%, and the range of participant profiles met the target of engaging at least four stakeholder groups.

The project validated the JackDaw GeoAI agent, the JackDaw API, preconfigured MCP services, the connection of external MooFind MCP services, voice input, natural-language interaction and polygon-based queries. Most stakeholder testing used the consortium’s preconfigured services. The integration worked, and participants generally valued the possibility of accessing map-based information without using complex GIS software. Feedback summary shows a SUS score of above 70% was achieved.

The main issues identified were slow responses and timeouts, inconsistent handling of some polygon-based queries, answers that were sometimes too long, limited support for highly specific regional questions and insufficient explanation of underlying data sources. Stakeholders also highlighted the need for clearer onboarding and more region-specific datasets and services.

WP4 consolidated validation findings and transferability lessons. Similar needs were identified across the three regions, indicating that the interface and user journey are transferable, while meaningful local use depends on connecting suitable regional data through MCP services. Internal testing and stakeholder feedback also led to improved guidance, expanded question examples and clearer recommendations for future development.

WP5 covered dissemination and final reporting. The required blog posts, social-media posts and news article were completed, together with the public platform, source-code repository, question bank and final reporting package.

The main deviations concerned format and timing. Group workshops were replaced by individual sessions because of stakeholder availability, different support needs and difficulty coordinating diverse groups. External testing also started later because technical familiarisation and platform development took longer than expected and coincided with the summer holiday period. Corrective actions included flexible scheduling, remote testing, direct follow-up, simplified guidance and use of preconfigured MCP services. These deviations affected the organisation and timing of validation but did not change the project's core objectives, technical scope or three-region approach.

KPI Analysis and Commentary

KPI	Approved target	Achieved	Achievement / assessment	Commentary
Number of stakeholders engaged	≥25 individuals	16	64% – Partially achieved	50+ stakeholders were approached but in the end only 16 people participated. Nine fewer participants than planned. Mentioned in details in Stakeholder Engagement and User Involvement section.
Validation responses	≥20 complete responses	16	80% – Partially achieved	All the people who participated gave feedback. Very few gave feedback through the form most preferred email feedback.
Usability score (SUS)	≥70/100	71%	Achieved	Sytstem Usabaility Scale(SUS) Score was collected as part of the structured usability assessment form. The eMooJI solution achieved an average SUS score of 70.8/100, slightly exceeding the project KPI target of ≥70/100. Individual scores ranged from 60.0 to 80.0, indicating an overall satisfactory level of usability while also showing variation in user experience and scope for further interface improvements.
Stakeholder diversity	≥4 stakeholder groups	5	Achieved	Validation included different rural-user perspectives. It included researcher, Project manager, farmer, Veterinary and Bureaucrat.
Validation/workshop sessions	3 regional sessions	Validation performed in all 3 regions; individual rather than group workshops	Achieved / methodology adapted	Geographic coverage was achieved, but the planned workshop format was replaced by one-to-one, online, in-person and independent testing.
Female	≥30%	68%	Achieved	Female participation reached 68%, substantially exceeding

participation				the project target of at least 30%. This demonstrates strong involvement of women across the project's validation activities and stakeholder groups.
Feedback categories analysed	≥5	≥5	Achieved	Feedback covered the proposed dimensions of usability, reliability, accuracy/output quality, accessibility and relevance/usefulness.
Significant improvements/issues identified	≥5	≥5	Achieved	Validation identified multiple actionable improvements, including faster response times, greater response reliability, clearer explanations of data sources, improved onboarding and examples, better handling of technical errors, and stronger availability of region-specific data/services.
Public dissemination outputs	2 blog posts + 2 social posts + 1 news article	2 blog posts + 2 social posts + 1 news article	Achieved	Report of the final published outputs and the evidence links provided in the dissemination section.

3. Solution Developed and Technical Results

During the project, Moofind developed a progressive web application called eMooJI, available at: https://emooji.moofind.com.
The application was created as a simple interface through which users could interact with the JackDaw GeoAI agent and explore map-based information using natural-language questions. The main purpose of eMooJI was to make JackDaw easier to test with various stakeholders who may not be familiar with complex mapping or GIS tools. The main features developed were:

- Voice commands, allowing users to ask questions by speaking instead of typing;
- Polygon-based Area of Interest selection, allowing users to draw a specific area on the map and ask questions about that location;
- Dark mode, improving readability and giving users an alternative display option;
- Chat Save feature for sharing and reviewing past analysis

These features were added to make the platform easier and more practical for different types of users.

The eMooJI application did not host its own AI agent or language model. Instead, it used the JackDaw agent hosted by the PoliRuralPlus consortium. This approach allowed the project to focus on improving the user experience and validating JackDaw in practical rural and agricultural use cases, rather than duplicating the consortium's existing AI infrastructure. User questions entered through the app were sent to AI Agent through the JackDaw API, and the resulting answers and map information were then shown to the user. The overall interaction worked as follows:

1. The user selects a specific area by drawing a polygon on the map.
2. The user entered a question by text or voice.
3. The question and location information are sent to the agent through the JackDaw API.
4. JackDaw agent processed the request using the available data services.
5. The response is displayed in the eMooJI web application.

The key technologies that were used are listed in Table 1 below:

Category	**Tools / Technologies**
Frontend Framework	Expo 51, React Native Web, Expo Router

Category	**Tools / Technologies**
Map & Drawing	Leaflet.js, leaflet-draw
AI Integration	JackDaw GeoAI (PoliRuralPlus), Model Context Protocol (MCP)
Backend Server	Node.js, Express.js
MCP Server	Python 3.12, FastAPI, SSE transport
Authentication	Firebase (Google, Email)
Database	PostgreSQL on Neon (serverless, free-tier, hosted in EU)
Session Recording	rrweb, rrweb-player
Version Control	Git
Deployment	Render.com (Node.js web service + Python MCP service, hosted in EU)
Development Environment	VS Code
Languages	JavaScript (JSX), Python, SQL

Table 1: List of Key technologies

Interoperability was achieved through the JackDaw API and MCP servers, which allowed eMooJI to connect with the consortium's services and external MooFind services. This modular approach supports the addition of new datasets and specialised tools without changing the core application. Figure 1 shows the high level architecture of the technical development during the Enhance Call.

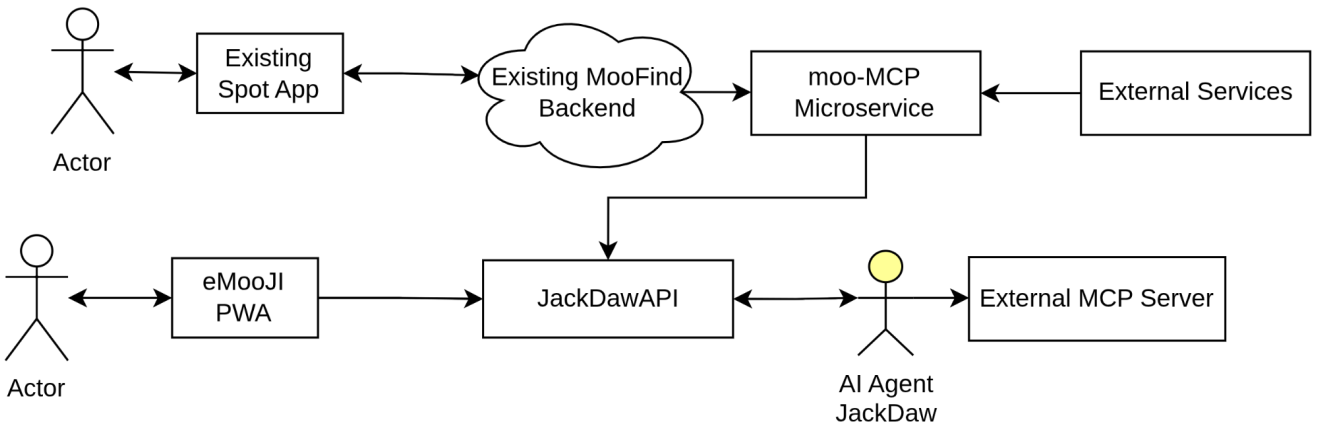

Fig 1: High level architecture of the eMooJI

The main technical outputs of the project were:

- the eMooJI progressive web application(PWA) developed using React Native Web;
- integration with the consortium-hosted JackDaw agent using the JackDaw API;
- voice input functionality;
- use of the preconfigured PoliRuralPlus MCP services along with the connection of Moofind MCP server;

Together, these outputs provided a usable interface for validating how conversational AI and map-based information can support users in agriculture, livestock management, landscape monitoring, and rural planning.

The solution was tested in practical validation activities with project stakeholders. These tests helped identify both the strengths of the interface and areas that still require improvement. The application should therefore be considered a functional pilot rather than a fully commercial product. Further work would be needed to improve response speed, consistency, error handling, onboarding, and the explanation of results before wider deployment. The work is aligned with the approved proposal, which planned the validation of JackDaw through agricultural and land-management questions, practical stakeholder testing, and the assessment of usability, reliability, and added value.

4. Integration and Contribution to PoliRuralPlus

The eMooJI platform was designed as an interface connected to the existing PoliRuralPlus technical ecosystem. The project did not host its own JackDaw instance but integrated the interface with the JackDaw APIs available at https://api.jackdaw.online/. Thus, Moofind could successfully integrate its platform to the existing JackDaw Ecosystem.

During the project, Moofind also successfully connected its own MCP servers to the platform. This demonstrated that external services developed by third parties can be connected to JackDaw and used as part of the wider ecosystem. For most of the validation activities, however, the project relied mainly on the preconfigured MCP services already available through PoliRuralPlus. The services already integrated to the JackDaw environment supports questions related to areas such as:

- vegetation and pasture conditions;
- land use;
- terrain and slope;
- environmental restrictions;
- protected areas;
- rural and agricultural planning.

The eMooJI App is open for use through the public web interface: https://emooji.moofind.com . eMooJI creates synergies with Moofind's other rural innovation activities. The MCP-based architecture could complement existing livestock monitoring, Earth Observation and farm-management services and in future plans include integration of the services developed under the Ruractive Call.

The project did not publish a new formal spatial dataset. Its main contribution was the creation of practical knowledge on how rural users formulate questions, interact with spatial information, and understand the answers provided by JackDaw. During the project, a question bank was developed containing practical examples of questions that can be asked through JackDaw. The question bank includes examples related to agriculture, livestock management, pasture monitoring, land use, and rural planning. It was created to support both project participants and future users who may not immediately know how to formulate useful questions for a GeoAI tool.

The question bank also serves as:

- an onboarding resource for first-time users;
- a source of examples for workshops and demonstrations;
- a reference for future validation projects;
- a basis for comparing how JackDaw responds to different types of questions.

The query bank is freely accessible as google doc so that it can be reused by other organisations, projects, farmers, advisors, researchers, and rural development actors. This contributes to the Enhance Call objective of generating transferable results that can be reused.

Additionally, in line with Moofind's commitment to open-source development and knowledge sharing, the source-code repository for the eMooJI platform has also been made public.

Public git repository: https://gitlab.com/moofind/emooji
Making the repository public allows other organisations to review the implementation, reuse or adapt the interface, test similar connections with JackDaw, build additional features and apply the approach in other regions or sectors.

The main contributions of eMooJI to PoliRuralPlus are:

- a public-facing interface connected to JackDaw;
- practical validation of the JackDaw API;
- testing of voice input and polygon-based area selection;
- confirmation that external MCP servers can be connected;
- a reusable and freely accessible question bank;
- a public source-code repository;
- practical evidence of how rural users interact with conversational spatial tools;
- feedback that can support future improvements to JackDaw and the wider PoliRuralPlus ecosystem.

The public platform, public repository, and freely available question bank together support transparency, reuse, and future improvement. These results strengthen the transferability and visibility of the project and support the PoliRuralPlus goal of making spatial information easier to access and understand for rural stakeholders.

5. Stakeholder Engagement and User Involvement

A total of 16 participants took part in the eMooJI validation, including 11 women (68.7%) and 5 men (31.3%). Female participation therefore significantly exceeded the project target of at least 30%. Participants represented all three validation regions: Spain with 7 participants, Germany with 6, and Scotland with 3. The group included farmers, researchers, veterinarians, technical specialists, project managers, public-sector officers, rural innovation professionals and agricultural association representatives.

Instead of the originally planned group workshops, the project used a one-to-one engagement approach. Some participants were met in person, while others joined online sessions or tested the platform independently. This approach allowed the team to explain eMooJI according to each participant's background, demonstrate the main functions, and discuss use cases connected to their land or professional activities.

During the sessions, participants tested practical questions using text or voice input. They received a short introduction, example questions from the question bank, and supporting guidance. Feedback was collected through direct conversations, email and telephone follow-ups, observations during testing, and an online feedback form. The approved validation approach allowed personal follow-ups alongside formal feedback collection.

Stakeholders generally valued the possibility of accessing map-based information through simple questions without using complex GIS software. Voice interaction was considered particularly relevant for farmers and other users working in the field. However, the feedback also indicated that the ecosystem remains a promising pilot rather than a fully mature operational tool.

Similar needs were observed across the three validation regions, supporting the wider transferability of the approach. The main issues identified were response speed and timeouts, inconsistent handling of polygon-based queries, answers that were sometimes too long, insufficient region-specific information. These findings informed the final improvement recommendations such as adding the voice interaction feature, the preparation of user guidance, and the development of the reusable question bank.

Regarding the original target vs the confirmed participants discrepancy: 16 confirmed participants against an original target of 25, corresponding to 64% achievement of the participant KPI and a deviation of 9 participants (36%).

This deviation can mainly be explained by three factors: the timing of the testing phase, delays and technical issues during platform development, and different levels of stakeholder engagement.

1. Timing of the testing phase:

The main testing period was too short and coincided with the summer holiday season (June-July), which significantly affected stakeholder availability, particularly in Spain and Germany, but also for farmers in Scotland. Stakeholder outreach had already started in April, May and June, and several organisations and individuals initially expressed their willingness to participate. However, the platform was not yet technically ready for testing at that stage, meaning that participation had to be postponed.

Once the platform became available around mid-June, availability decreased considerably. In Germany in particular, the period from mid-June through July overlaps with school holidays and the main summer vacation period, while similar availability constraints were experienced in Spain. Some stakeholders stopped responding during this period, while others who had previously confirmed their participation were unavailable or responded only after a considerable delay. Consequently, in several cases we could not reliably confirm whether the invited stakeholders had completed the testing.

2. Technical development and testing delays:

Platform development and technical validation required more time than initially anticipated. The platform was only sufficiently ready for broader stakeholder testing by mid-June, leaving a relatively short window for organised testing before the summer holiday period.

In addition, some participants encountered technical errors, particularly API-related error messages, during the testing process. These users were contacted and encouraged to test the platform again once the issues had been addressed. However, because of the limited remaining timeframe and stakeholder availability, not all of these participants could be followed through to confirmed completion.

For reporting purposes, we therefore adopted a conservative approach and counted only participants for whom we got feedback on their participation. There are indications that the actual number of people who interacted with the platform was higher than 16. Platform logs showed additional usage, but the system did not collect sufficient identifying information to reliably associate every interaction with an individual participant since we were not recording email and names on the platform. Furthermore, stakeholders were encouraged to circulate the platform among colleagues. For example, at UOC at least three participants tested the platform directly during a meeting, after which it was also circulated within the department. Since these additional users could not be individually verified or identified, they were not included as participant KPI.

3. Different levels of stakeholder interest

Stakeholder engagement also varied depending on the profile of the participant. Some stakeholders showed strong enthusiasm for the innovation and actively explored the platform and provided detailed feedback. Others, particularly stakeholders closer to day-to-day farming activities, were more cautious about its practical applicability and required clearer evidence of how the solution could fit into real farming workflows before committing time to testing. This resulted in a lower conversion from initially interested or contacted stakeholders to fully confirmed testing participants than originally anticipated.

Target vs. achieved KPI analysis

Although the quantitative participant target was not fully achieved, we believe the 16 confirmed participants provided sufficient diversity and depth of feedback to meet the qualitative objective of the testing activity. Participants provided feedback through questionnaires, direct communication and observed testing sessions, allowing us to identify both the perceived benefits of the platform and important technical and usability limitations. Moreover, the reported figure of 16 should be considered a minimum verified participation figure rather than necessarily the total number of actual users, since additional platform usage and internal circulation among participating organisations could not be reliably attributed to identifiable individuals.

Overall, while the participant-number KPI was partially achieved, the testing of 16 participants generated enough evidence to provide a representative picture of stakeholder reactions, technical issues, usability challenges and potential benefits.

GDPR and Data Protection Compliance
MooFind followed a data-minimisation approach during the eMooJI validation. Only limited participant information was collected where necessary for project reporting, such as name, gender, approximate age, professional role, organisation and region. No sensitive personal data were intentionally collected.

Participants were informed about the purpose of the pilot and the use of their feedback. In some initial in-person interactions, consent was provided orally but was not systematically documented. As a corrective measure, participants whose identifiable information was retained were contacted to obtain documented confirmation, including by email. These consent records are securely stored within MooFind's internal project documentation.

Feedback and survey results were used only for project validation, KPI assessment and reporting, and are presented externally in aggregated or anonymised form.

Within the eMooJI app, users are informed that chatbot interactions may be stored and analysed to improve usability. Without accepting this the chat interface doesn't open. The platform does not intentionally store personal participant data as part of these interactions. Chat records used for analysis are stored anonymously and are not linked to participant names, survey responses or email addresses.

Access to identifiable participant information and consent documentation is restricted to the MooFind project team.

6. Communication, Dissemination and Visibility

MooFind completed the required communication outputs:

1. 2 blog posts
    a. Bringing AI Closer to Farmers: How eMooJI Makes Map-Based Decisions Easier — PoliruralPlus
    b. https://www.poliruralplus.eu/knowledge-transfer/blog/testing-geoai-beyond-the-lab-lessons-from-the-emooji-project/
2. two social media posts
    a. https://www.linkedin.com/posts/emooji-poliruralplus-geoai-share-7472932408779132929-bWVy/
    b. https://www.linkedin.com/feed/update/urn:li:activity:7488603185121533952 , and
3. one news article
    a. MooFind launches eMooJI: A Multilingual Progressive Web Interface for the JackDaw GeoAI Platform — PoliruralPlus

The content covered the project launch, eMooJI development, stakeholder validation, key findings, and future exploitation of the solution.

The communication posts have incorporated properly the funding acknowledgement: "*PoliRuralPlus has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No. 101136910. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.*"

The publications have also properly incorporated the "Funded by the European Union" logo alongside the PoliRuralPlus logo, in line with the project's communication and visibility requirements. In the LinkedIn post, the images were added in the comments section of the LinkedIn post to avoid double-posting.

The MooFind website (www.moofind.com) has also been updated with the previously published blog posts and relevant project information. It includes the required acknowledgement of PoliRuralPlus and EU funding and provides a link redirecting visitors to the main PoliRuralPlus website.

Visibility was also supported through stakeholder demonstrations, a tutorial, multilingual onboarding materials, a feedback form, and a reusable question bank. The main public results include:

1. eMooJI platform: https://emooji.moofind.com
2. Public source-code repository: https://gitlab.com/moofind/emooji
3. Freely accessible question bank: Query Bank
4. and user-support materials: Training Material and Onboarding guide

Published materials acknowledged the support received through PoliRuralPlus and the European Union's Horizon Europe programme. GDPR-compliant screenshots and visual materials were used where applicable.

7. Impact Assessment

The main impact of eMooJI was the practical validation of a conversational GeoAI interface for rural and agricultural users. The project demonstrated that JackDaw can be accessed through a simpler web application combining natural-language questions, voice input, and polygon-based area selection. This reduced the need for users to work directly with complex GIS tools and showed how GeoAI services could complement existing farm-management and rural-planning applications.

From a technical perspective, the project validated the JackDaw API, preconfigured MCP services, and the connection of external MooFind MCP servers. It also produced a functional pilot, a public source-code repository, and a reusable question bank.

The social impact was mainly related to accessibility and inclusion. Stakeholders from Germany, Scotland, and Spain tested the platform, including farmers and other actors with different levels of digital experience. Voice interaction, multilingual use, guided demonstrations, and practical question examples helped lower barriers to participation.

Economic and environmental impacts were not directly quantified during the short validation period. However, the solution has potential to reduce the time needed to access spatial information and to support better-informed decisions related to pasture conditions, land use, protected areas, and rural planning.

The project also reflected New European Bauhaus principles. Sustainability was addressed through reuse of existing digital infrastructure and open-source outputs; inclusion through multilingual, voice-based, and user-friendly interaction; and aesthetics through a clear interface, map-based interaction, and dark mode. Overall, eMooJI contributed practical evidence, reusable outputs, and stakeholder feedback to the future development of the PoliRuralPlus ecosystem.

8. Challenges, Risks and Lessons Learned

One of the main technical challenges was the learning curve associated with understanding and using Model Context Protocol (MCP) servers. At the beginning of the project, the team needed time to understand how MCP servers connect data and services to the JackDaw agent, how individual services are configured, and how queries are processed through the wider technical environment.

Moofind successfully developed and connected its own MCP servers during the project. However, most validation activities relied on the preconfigured MCP services provided through the PoliRuralPlus environment. This dependency on the JackDaw services hosted by the consortium also created a challenge. The platform depended on the availability, response time, and behaviour of the external JackDaw API and connected services. This reduced technical risk and allowed the team to focus on testing the user experience and practical use cases.

In order to mitigate this some proactive and reactive actions were taken:

- regular internal testing of the interface and API connection;
- gradual testing of MCP connections before involving external users;
- use of preconfigured MCP services as the main validation environment;
- preparation of example questions to reduce uncertainty during user testing;
- documentation of errors, unclear responses, and technical limitations;
- direct communication with the PoliRuralPlus technical team when clarification or support was needed.

The main non-technical challenge was involving a sufficiently diverse group of stakeholders in the validation activities. The project aimed to engage farmers, rural development organisations, researchers, environmental actors, advisors, and other rural stakeholders. In practice, these groups had different levels of availability, digital confidence, interest, and familiarity with AI and map-based tools. Farmers were generally easier to engage through existing contacts and direct communication. Non-farmer stakeholders often required more formal outreach, additional explanations, and advance scheduling.

Regarding this participation, the experience also highlighted important lessons for future validation activities due to the lack of participant achievement: the need to have the platform technically stable earlier, the need to run longer periods for implementation, avoid major holiday periods when scheduling stakeholder testing, and improve participant tracking and analytics.

A key lesson learned from the project concerns GDPR compliance. For future pilot activities, written or electronically recorded consent will be obtained before collecting any personal participant data. Consent procedures and GDPR documentation will be integrated into the participant onboarding process from the outset to ensure that data protection requirements are addressed consistently throughout the project.

A further challenge was the timing of the platform readiness. By the time the tool was ready for wider stakeholder use, many non-farmer stakeholders had already started their summer holidays. This delayed several testing activities and resulted in much of the final usage and feedback collection taking place during the last week of the project. This created additional pressure on stakeholder follow-up, collection of completed feedback forms, analysis of results, consolidation of evidence and the preparation of the final report.

To reduce the impact of these delays, Moofind:

- followed up directly with stakeholders through email, telephone, and personal contacts;
- offered both guided and independent testing;
- allowed participants to provide feedback through different channels;
- shared the platform remotely to avoid the need for additional physical meetings;
- prioritised stakeholders who were available during the final project period;
- prepared a simple feedback form and supporting explanations;
- continued collecting and consolidating feedback as close as possible to the reporting deadline.

A key lesson was that connecting a new interface to an AI and geospatial ecosystem requires sufficient time for technical familiarisation before user validation begins. Future projects should include a dedicated early phase for understanding the available APIs and MCP services, confirming which services are stable and ready for use, testing complete user journeys, preparing fallback options, documenting common technical errors and verifying response times and service availability.

The project also showed that using preconfigured MCP services is useful for reducing complexity during early-stage validation. External or custom MCP services can then be introduced gradually after the standard setup is stable.

Another lesson was that technical functionality alone is not sufficient. Users need clear explanations of what the system can do, what data it can access, and how questions should be formulated. For rural and agricultural stakeholders, personal communication remains particularly important. Direct calls, individual demonstrations, and trusted introductions were more effective than general invitations. The project also showed that different stakeholder groups require different onboarding approaches:

- farmers generally benefit from short, practical examples connected to their own land;
- researchers and technical stakeholders require more information about data sources and system limitations;
- rural organisations are often interested in how the tool can support communication, planning, or engagement;
- first-time users need example questions and step-by-step guidance.

The question bank developed during the project was especially useful because it gave participants a starting point and reduced the difficulty of deciding what to ask. Based on the project experience, the following improvements are recommended:

- provide technical documentation and practical MCP examples at the beginning of the project;
- confirm access to stable APIs and services as early as possible;
- organise an early technical support session focused specifically on MCP integration;
- begin stakeholder recruitment before platform completion;
- avoid scheduling the main validation period during common holiday periods;
- maintain a reserve list of potential participants;
- conduct validation in several smaller rounds rather than one final round;
- provide a simple user guide and question examples before testing;
- clearly communicate system limitations to participants;
- leave sufficient time between feedback collection and final reporting;
- separate technical testing from end-user usability testing.

These lessons are relevant not only for eMooJI but also for other projects validating AI-supported tools with rural stakeholders. They reinforce the importance of combining technical preparation with early, continuous, and flexible stakeholder engagement, as required by the Enhance Call and the approved validation approach.

9. Sustainability, Replicability and Next Steps

The main results of eMooJI are designed to remain available beyond the project period. The eMooJI platform is open for use, and the source code has been published in a public repository. The question bank developed during the project is also freely accessible. Together, these outputs provide a practical basis for future demonstrations, training activities, stakeholder engagement, and further technical development.

The project therefore leaves behind more than a temporary pilot. It provides:

- a working web interface connected to JackDaw;
- voice-based interaction;
- polygon-based Area of Interest selection;
- Chat storage and export feature;
- a reusable question bank;
- a public source-code repository;
- practical experience from stakeholder validation;
- a tested approach for connecting additional services through MCP servers.

These outputs can continue to support Moofind, PoliRuralPlus, and other organisations interested in applying conversational map-based tools in rural and agricultural settings. The continued use of the platform will depend partly on the future availability of the JackDaw services and APIs provided by the consortium. However, the open-source nature of the interface makes it possible to maintain, adapt, or extend the application as the wider ecosystem develops.

eMooJI was tested and validated in three European regions: Germany, Scotland, and Spain. These regions differ in climate, farming systems, landscape conditions, and stakeholder profiles. Despite these differences, the feedback received was broadly similar. Participants generally valued the possibility of asking questions in simple language and accessing map-based information without using complex GIS software.

Common needs included:

- clear and reliable answers;
- shorter response times;
- simple onboarding;
- practical question examples;
- better explanation of data sources;
- regionally relevant information.

This suggests that the general concept is transferable across different rural regions. The same basic interface and user journey can be reused without major changes. However, the testing also showed that meaningful regional replication requires access to relevant local data. Users are most interested in questions linked to their own territory, such as local pasture conditions, protected areas, land-use rules, regional datasets, or specific agricultural practices.

For this reason, future versions should include region-specific services connected to region-specific data. The MCP-based structure makes regional adaptation easier. Instead of rebuilding the complete platform for every new region, specific data services can be added through separate MCP servers.
Additionally, these services can connect JackDaw to local or regional datasets without using the eMooJI user interface. For example, a regional MCP service could provide access to local pasture or vegetation data, regional land-use maps, protected-area information, administrative boundaries, local agricultural registers, region-specific environmental indicators, public datasets from municipalities or regional authorities. This modular approach reduces the need for major changes to the main platform. New regions can be added by connecting suitable services

and datasets rather than redesigning the complete application. It also allows different organisations to contribute their own data or services while continuing to use the same user-facing interface.

The proposed next steps are:

- Maintain public access to the eMooJI platform and repository.
- Publish and update the question bank.
- Improve onboarding materials and step-by-step guidance.
- Continue improving response speed, clarity, and error handling.
- Develop region-specific MCP services using relevant local datasets.
- Test the platform in additional rural regions and use cases.
- Continue collaboration with the PoliRuralPlus consortium on JackDaw development.
- Explore future projects where eMooJI can support agriculture, rural planning, and environmental monitoring.

Overall, eMooJI has strong potential for reuse because the core interface can remain the same while regional content is added through MCP-based services. The validation in three regions showed that the main user needs are comparable, while the value of the platform increases when the available data reflects the local context. This supports the wider PoliRuralPlus objective of creating transferable and reusable digital tools for rural areas.

10. Conclusions

Overall, eMooJI successfully achieved its core purpose under the PoliRuralPlus ENHANCE Call: to apply, test and assess the JackDaw GeoAI ecosystem in practical agricultural and land-management contexts. The project demonstrated that conversational access can make spatial information easier to explore for farmers, advisors, researchers and rural organisations that may not regularly use GIS tools. At the same time, the validation confirmed that the solution should still be considered a functional pilot rather than a fully mature operational product. Improvements are needed in response speed, reliability, spatial-query handling, data-source transparency and access to region-specific information.

A key achievement was the development of the eMooJI progressive web application as an accessible interface connected to the consortium-hosted JackDaw agent. The application combined text and voice interaction, polygon-based Area of Interest selection, multilingual use, dark mode, and conversation-saving and export functions. The project also validated the JackDaw API, used the preconfigured PoliRuralPlus MCP services and demonstrated that an external MooFind MCP server could be connected to the ecosystem.

The project extended beyond technical integration by involving stakeholders in Germany, Scotland and Spain through individual in-person and online validation activities. This produced practical feedback on usability, response quality, reliability and relevance. The broadly similar feedback across the three regions indicates that the general conversational interface is transferable, although its practical value depends on the availability of suitable local datasets and specialised regional services.

Further achievements included the creation of a freely accessible question bank, user-support materials, a public-facing platform, an open-source repository and the required communication outputs. These results support reuse by other organisations and contribute practical knowledge on how rural stakeholders formulate and interpret spatial questions.
Strategically, the project showed that JackDaw and the MCP-based architecture could become valuable additions to MooFind’s existing application and cloud backend. Farmers could access information through natural language or voice instead of navigating several menus, while new services and regional datasets could be added modularly through MCP servers. The main strategic value of eMooJI is therefore not only the pilot application itself, but the

validated approach for combining conversational AI, spatial services and existing rural digital platforms. This provides a foundation for continued development, regional adaptation and future agricultural, environmental and rural-planning use cases.

Annexes

PoliRuralPlus Technical Validation Questionnaire

Validation of PoliRuralPlus Technical Ecosystem Concepts, Tools & Components.

Questions can be given as simple statements or sentences where suitable. It is not necessary to provide a comprehensive text. Where the question is irrelevant to the project, state **N/A**.

The technologies covered under this questionnaire include:

- Jackdaw GeoAI chatbot
- PoliRuralPlus Advisor
- RAG/GeoRAG
- Vulture
- Data harmonization tools and pipelines
- Data publishing concept

Participation in Webinars (initial Training Sessions)

1. Which PoliRuralPlus technical sessions did members of your project attend or review recordings of? Indicate: Attended live / Watched recording / Not reviewed.
   We attended two technical sessions. We met the developer team in Brussels in person and the Athens Bootcamp was attended online. In addition to that Online Webinar Recording titled How to write new services for JackDaw, How to Run JackDaw Locally, Introducing JackDaw were very reviewed.
2. Which sessions were most relevant to your project?
   Brussels in person meeting with Runar and the recording titled how to write new services for JackDaw were most useful.

Awareness and Understanding of the PoliRuralPlus Ecosystem

3. Were you aware of the Jackdaw ecosystem and related tools before participating in the cascade funding activities in PoliRuralPlus?
   No
4. Which ecosystem components are you familiar with
   RAG
5. Briefly describe how you understand the purpose of the Jackdaw ecosystem within PoliRuralPlus.
   The JackDaw ecosystem aims to make spatial data and related knowledge easier to access through natural-language interaction. It provides a common environment where RAG and GeoRAG methods can retrieve knowledge from connected datasets and use it to generate context-aware answers. MCP servers make this ecosystem extensible by allowing additional data sources and specialised services to be connected, so JackDaw can support different rural, agricultural, environmental, and policy-related use cases.

Actual Testing or Validation

6. Did your project test or experiment with any ecosystem technologies?
   Yes

7. Which components were actively validated in your project work?
   The project actively validated the JackDaw GeoAI agent, the APIs, the preconfigured MCP services, and the connection of external Moofind MCP servers. We also validated the eMooJI interface developed around JackDaw, including text and voice input, polygon-based area selection,
8. Describe how the technologies were tested (internal testing, integration, stakeholder demos, pilot studies, evaluation exercises).
   The technologies were first tested internally to verify the eMooJI interface, JackDaw API connection, voice input, polygon-based area selection, and access to the available MCP services. They were then demonstrated to stakeholders in guided sessions, where participants tested practical rural and agricultural questions and provided feedback on usability, response quality, and relevance.

Technical Implementation

9. Did you implement or configure any of the technologies provided in the form of services, custom plugins/services, local deployment, RAG/GeoRAG pipelines, data harmonization workflows, data cubes, pipelines, or data publishing?
   Yes
10. If yes, describe the technical architecture used (local deployment, cloud deployment, integration with existing systems, API-based integration).
    API based Integration
11. Did you develop new services or extensions? If yes, describe.
    Yes. We developed an MCP server to access external APIs. We plan to improve, by adding our internal microservices to the MCP server to enhance the service provided to our customer.

Use Cases and Policy Applications

12. In which domain did you apply Jackdaw ecosystem technologies (e.g., rural planning, agriculture, land management, climate monitoring, policy analysis, community participation, state your own sector as you see fit)?
    Agriculture and land management
13. Did the tools support policy intelligence or decision-making processes?
    The undertone from the stakeholder feedback is that the tool is not ready but looks promising
14. Did you use any of the technologies provided to analyse policy scenarios?
    No
15. Did you use any of the provided concepts for collaborative planning or stakeholder interaction?
    No
16. Did you experiment with RAG or GeoRAG approaches for knowledge retrieval?
    Yes

Data and Knowledge Integration

17. Did your project publish any datasets?
    No. The project did not publish a new formal dataset. However, it produced a reusable question bank that can be used by stakeholders for reference, validation findings, and an open-source web application that can support future testing and connection to regional datasets through MCP servers.
18. Did you perform data harmonization to make datasets compatible with the ecosystem?
    No
19. Did you create or use centrality datasets for rural network analysis?
    No

20. Did you use the data cube or centrality measures approaches to process spatial or temporal data?
    No

Evaluation and Feedback

21. What aspects of the technologies worked well?
    The smooth integration with existing platform
22. What limitations or challenges did you encounter?
    The limited capability of the existing services when it comes to specific use cases.
23. Did stakeholders or users provide feedback during testing? Summarize key insights.
    Yes. Stakeholders provided feedback through one-to-one testing sessions, online demonstrations, direct conversations, emails, telephone follow-ups, and feedback forms. They valued the simple natural-language and voice-based interaction, but identified slow responses, occasional timeouts, inconsistent polygon-based queries, overly long answers, and the need for more region-specific data and clearer information on data sources.

Evidence of Validation

24. Provide evidence *if available* (screenshots, demo videos, reports, evaluation results, prototypes, repositories – you may paste text or images here, supply links for documents or videos or web resources)
    eMooJI platform: https://emooji.moofind.com
    Public source-code repository: https://gitlab.com/moofind/emooji
    Freely accessible question bank: Query Bank
    and user-support materials: Training Material and Onboarding guide
    Further evidence in the confidential report

Future Potential

25. Would you consider continuing to use technologies like the PoliRuralPlus ecosystem after the project? (yes, no, why/why not)
    Yes. We would consider continuing to use the PoliRuralPlus ecosystem because a chatbot can provide farmers with a simpler way to access information than navigating through several application menus. Features such as voice commands make it easier to ask practical questions while working in the field, making JackDaw and its connected services a valuable addition to Moofind's existing application and cloud backend.

26. Which of the components you have used or assessed have the highest potential for further exploitation?
    In our humble opinion, The JackDaw GeoAI agent and RAG based MCP server integration architecture have the highest potential for further exploitation. Together, they provide a flexible way to connect region-specific datasets and services while offering users a simple conversational interface. This makes the ecosystem well suited for integration into existing agricultural and rural applications, where farmers can access spatial information through natural language or voice commands instead of navigating complex menus. That's why we would like to continue using the service beyond the validation program.

27. What improvements would make the ecosystem more useful?
    The ecosystem would become more useful through faster and more reliable responses and it would benefit from additional region-specific datasets and services.