MIND STEP

MODELLING INDIVIDUAL DECISIONS TO SUPPORT THE EUROPEAN POLICIES RELATED TO AGRICULTURE

D8.4 Draft Exploitation Strategy and Plan

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1. INTRODUCTION

This first version of the Exploitation Strategy and Plan in MIND STEP describes the approach of the consortium to planning the exploitation of the project's results and findings. To this aim, the work package leaders in conjunction with GEO (WP8 leader) and WR (Coordinator) have worked in the past months towards identifying and characterising the key exploitable results in light of the project results produced to date as well as those results that are expected to be produced in the upcoming period of the project. Accordingly, a set of **13 key exploitable results (KERs)** has been complied and are presented in this report.

The draft Exploitation Strategy and Plan will be followed by an adapted, operational Exploitation Plan in Month 52 (Deliverable D8.6), which will outline the final strategy and plan for exploiting the results of MIND STEP after the end of the project.

The Exploitation Strategy and Plan will be regularly reviewed and updated in the next phase of the project to ensure dynamic and successful exploitation of project results, to ensure protection and avoid infringement of Intellectual Property Rights, and to mitigate risks that could endanger the exploitation of the results. In particular, all the upcoming deliverables and results will be characterised for identifying any additional KERs, Stakeholder Advisory Board (SAB) will be consulted for feedback, and sustainability aspects will be investigated.

2. EXPLOITATION: WHAT IS IT AND WHY IT IS NEEDED?

Exploitation is an essential step to help maximise the expected impacts of Horizon 2020 projects. It concerns the use of the project results by the relevant end-users and target groups. To this end, communication and dissemination actions directly support the exploitation goals.

The term "exploitation" is defined under the Horizon 2020 Rules for Participation as follows: *"Each beneficiary must – up to four years after the period set out in [GA] Article 3 – take measures aiming to ensure 'exploitation' of its results by: (a) using them in further research activities; (b) developing, creating or marketing a product or process; (c) creating and providing a service, or (d) using them in standardisation activities."*

Each beneficiary must take measures aiming to ensure the exploitation of their results, either by themselves (e.g. for further research or for commercial or industrial exploitation in its own activities) or by others (other beneficiaries or third parties, e.g. through licensing or by transferring the ownership of results).

Beneficiaries must be proactive and take specific measures to ensure that their results are used (to the extent possible and justified). However, exploitation does not necessarily need to be done directly by the beneficiaries themselves. They can also promote the exploitation of project results by third parties, for example by policy makers for evidence-based policy making, by other researchers for advancement of knowledge, etc. in accordance with the requirements established in the Grant Agreement as well as the Consortium Agreement.

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3. EXPLOITATION STRATEGY IN MIND STEP

The mid- and long-term exploitation of the results of MIND STEP are expected to contribute to the effectiveness and efficiency of policies as its suite of models will help policymakers to take better decisions in the design, monitoring and evaluation of policies. Based on a common data framework, MIND STEP will develop IDM models, including agent-based models, focusing on different topics in an integrated manner in different regional case studies.

Evidence-based policy making has become standard for effective and efficient government. This implies the development and maintenance of an appropriate suite of models for policy design and monitoring which MIND STEP will deliver. This suite of models (or toolbox) is expected to contribute to tackling challenges in policy making.

The Exploitation Strategy and Plan in MIND STEP has the overall aim of maximising the impacts created by the project by facilitating the use of its outputs and findings. The specific objectives of the Exploitation Strategy and Plan are as follows:

- OBJ-01: map key project exploitable results (KERs), deliverables and activities onto areas of application, prospective users and timescales;
- OBJ-02: assess the development status (i.e. content and timing) of approaches and outputs;
- OBJ-03: clarify and update approaches to any issues relating to IPR;
- OBJ-04: provide an assessment of risks related to KERs – methodological, financial, support mechanisms, infrastructure;
- OBJ-05: provide the exploitation aims and claims, and individual exploitation plans of each partner;
- OBJ-06: explore the best practices in the governance of model consortia, and research infrastructures;
- OBJ-07: assess the main methodological competitors, complementary or parallel projects, and competitive advantages of MIND STEP;
- OBJ-08: consider options for business models for different types of prospective users (e.g. public and private sector);
- OBJ-09: provide a roadmap for roll-out, uptake and post-project exploitation, considering validation and standardisation issues, demonstrations of performance and benefits;
- OBJ-10: identify the mechanisms of the MIND STEP Communications, Dissemination and Impact Strategy and Plan for use in achieving the aims of project Exploitation and legacy.

MIND STEP has a dedicated Work Package (WP8) which focuses on the effective communication, dissemination, exploitation and impact of project results. The aims of exploitation activities are to create conditions for:

- Sustaining project outcomes after the funding period to influence future strategic planning of value chain businesses and policy;
- Maximising the exploitation potential of project activities, findings and outputs;
- Supporting the use and benefits of the outcomes during and beyond the project lifetime.

All MIND STEP project partners are involved in dissemination and exploitation to foster awareness and the transfer of results for the creation of impacts. Such impacts are expected to be in their own countries, communities, and sectors, and in other countries that are otherwise not represented in the consortium.

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One representative of each consortium partner was assigned as a Communication-Dissemination Officer (COMDISS Officer) at the beginning of the project. Meetings of the COMDISS Officers are held online regularly (usually every project quarter) and serve the purpose of continuous planning, supervision and improvement of communication, dissemination and exploitation activities.

Three Phases of Planning Exploitation in MIND STEP

Phase 1: key results that are deemed appropriate for exploitation (key exploitable results, KERs) shall be regularly identified and assessed (also including IPR) by the WP and Task leaders along with the emergence of deliverables with project results in the technical WPs.
Phase 2: an analysis is made of the best practices in the governance of model consortia and research infrastructures.
Phase 3: all project partners shall describe their expectations and claims of partners on the key exploitable results.

Planning the exploitation activities is a progressive, iterative process, supported by stakeholders, whenever possible. The identification of the post-project exploitation is articulated into three phases, which starts with the identification of the Key Exploitable Results. To prepare the partners for this exercise, GEO held bilateral meetings with WR to plan the involvement of MIND STEP partners in the identification of KERs, and **an internal exploitation workshop was conducted on 15 October 2021** with the participation of the work package leaders.

MIND STEP

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Exploitation Workshop for WP Leaders

MIND STEP Task 8.2 Exploitation Strategy and Plan
15 October 2021

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Geonardo (GEO)

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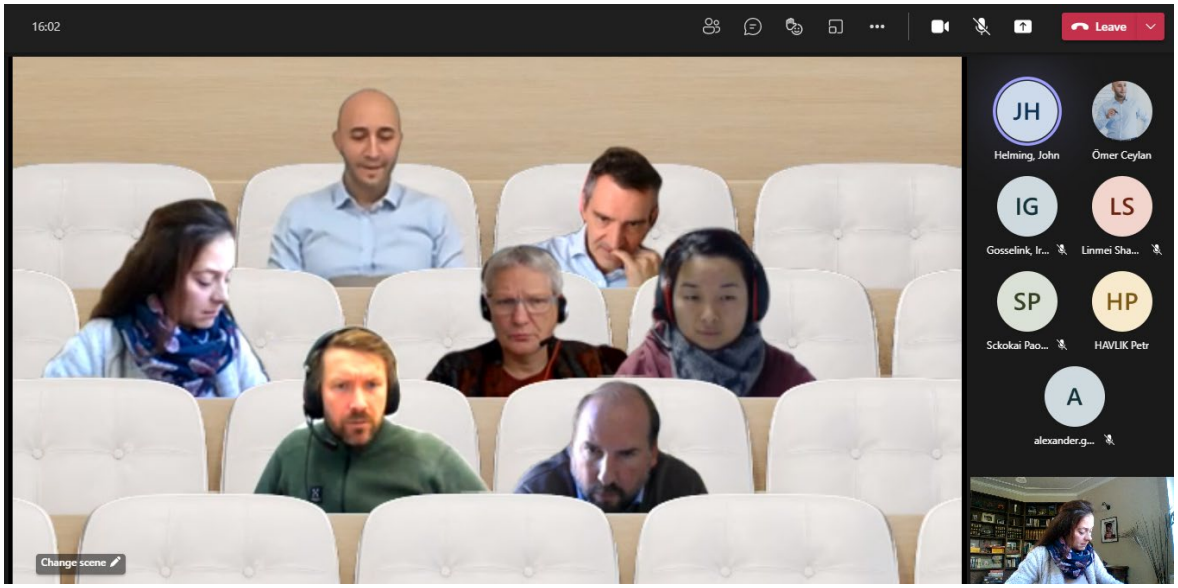

The objective of this workshop was to guide the WP leaders on exploitation and how to assess the key exploitable results (KER) of the project, filling in the table for the characterization of KER for the relevant deliverables, which is included in this report. GEO led the discussions on the content of the Exploitation Plan and Strategy which will be essentially useful for the consortium itself. This document shall help the partners understand the key concepts as well as the options they have for exploiting the project's results and protecting them, if necessary. Partners were reminded that exploitation is an obligation as of the MIND STEP GA, and the elements of the final Exploitation plan were discussed such as the governance structure and exploitation model, and ownership of results (including IP issues). It was agreed that the MIND STEP Model Toolbox is among the most important elements of the projects to be exploited, however, as the deliverables connected to the Toolbox are not yet ready (M44) specific exploitation routes for this result are yet to be defined. Research outputs, reports, methodologies, datasets, policy validation are to be exploited, therefore need to be characterised as well.

4. KEY EXPLOITABLE RESULTS

The first step for developing the appropriate and comprehensive Exploitation Plan was to identify a list of Key Exploitable Results (KERs) developed in the MIND STEP project. An indicative set of generic questions were used to guide the thinking of what constitutes an exploitable result. Preliminary plans shall be made for the future exploitation routes of the project results. The potential route for each Key Exploitable Result needs to be described.

4.1. Key Exploitable Results in MIND STEP

Work Package leaders, in conjunction with the task contributors, have identified **13 Key Exploitable Results** as of M27 of the project. This section provides a detailed assessment of each of these KERs. Additional KERs will be added, and the existing ones will be revised in the next phase of the project.

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Key Exploitable Results in MIND STEP (as of M27)

1. Key policy questions for ex-ante Impact Assessment of EU Agricultural and Rural Policies
2. Report on the Indicator framework for measuring the impact of policies/global drivers on IDM units in agriculture
3. Report on the conceptual framework of the MIND STEP project
4. Final version of Interfaces for economic databases
5. Literature review of methods for linking economic and bio-physical databases
6. Database for linking economic and bio-physical data
7. Develop an overarching model structure (report) for modelling IDM farm units in the agricultural sector together with parallel working consortia
8. Report on modelling a structural change / strategic behaviour / farm exit model
9. Report on extensions of Farm AgriPoliS and experimental insights with FarmAgriPoliS on farmers' response to Rural Development measures and opportunities and interfaces with the MIND STEP model toolbox
10. Report to model the supply chain mechanisms and the bargaining position of farmers along the chain and interfaces with MIND STEP model toolbox
11. Surrogate Model of the Complex IDM FarmDyn Using Deep Neural Networks
12. MIND STEP model toolbox
13. Report on options for quality management, validation requirements & suitability of validation tools

Exploitable result No.1: Key policy questions for ex-ante Impact Assessment of EU Agricultural and Rural Policies. Date: December 2020	
Which WP/Task the Exploitable Result (ER) is from?	WP1/task 1.1
Who is the Lead Partner of this result?	UCSC
Which MIND STEP partners are involved in the development?	UCSC, WR, UBO, IIASA, IAMO, THUENEN, WU, INRA, Ruralis, JRC, GEO
Please provide the main description of the result (one paragraph abstract of the result)	The objective of this report is to review the existing and future policies as well as some key global drivers affecting the agricultural sector in the EU to set the research agenda for MIND STEP. Stakeholders' engagement led to the definition of the key policy questions and benchmark scenarios that have been used to build the MIND STEP framework. A clear focus on environmental policy objectives emerged from the interviews. The importance of the environmental issues coherently emerged also for the proposed scenarios, where stakeholders indicated more frequently environmental and low carbon setups. As regards modelling issues, the importance to analyse the trade-offs between economic and environmental objectives, and among environmental objectives, also clearly emerged.
Please describe the innovation content of result:	Policy objectives and benchmark scenarios obtained have a clear environmental and climate focus. This scenario definition is essential for realistic modelling of environmental and economic impacts of agricultural policies at farm level.

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Does (or will) this result contribute towards European policy objectives and strategies and have an impact on policy making? How?	Yes, but indirect via improved and enhanced modelling efforts of environmental and climate change policy objectives to improve development of evidence-based policies.
Does (or will) this result have an impact on SMEs?	No, not directly.
Have you protected or will you protect the IPR of this result? How? When?	No, publicly available/available for free.
What could be the barriers/risks for implementation? (Technological Risks, Partnership Risks, Market Risks, IPR/Legal Risks, Management and Financial Risks, Environmental, Regulation, Safety and Other Risks)	IPR risk assessment
Which MIND STEP partners are/will be involved in the deployment / commercialization?	MIND STEP partners working on quantitative modelling
Where are the current and prospective markets/customers/target groups considering drivers for uptake of this ER (including users in business, education, science and policy)? (if available for free, there is no market).	Researchers, modellers, students, policy makers
What are the benefits for the customer/target group? How does the ER contribute to the expected impacts (EI) of the MIND STEP topic call RUR-04-2018 and to the relevant EU strategies?[2]	There are indirect benefits for the target group/customer. Results from scenario definitions are used to improve modelling approaches at different scales. Policy makers, producers and society will gain from more realistic analysis of economic and environmental effects at farm and sector level.
When is the knowledge available for exploitation?	December 2020 (Deliverable already approved)
Will there be costs incurred after the project and before exploitation (e.g. costs for training of staff, user license software (GAMS/GEMPACK)	None

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What is the market size in M€ for this result and relevant trend?	The results of the deliverable are a public good. They have also been already published in a research paper. Everybody could use the approaches and methodologies discussed for their own purposes e.g. scenario proposed can be used for modelling of economic and environmental impact of policies at different scales.
What are the competing, related, complementary, or overlapping, parallel projects or methods?	Projects working on tools to analyse impact of policies for the agricultural sector, such as AGRICORE and BESTMAP.
What are the competitive advantages of MIND STEP for this result?	Results of the task are in input for other MIND STEP WPs and will be directly used as input for the data framework in WP2, the modelling work in WP3, WP4 and WP5 and for the policy evaluation in WP6.
How would you promote your work (to get the results used)?	Social media promotion/CORDIS/Zenodo Scientific article already published open Access: Coderoni S., Helming J., Pérez-Soba M., Sckokai P., Varacca A. (2021). Key policy questions for ex-ante impact assessment of European agricultural and rural policies, Environmental Research Letters, 16 (2021) 094044, https://doi.org/10.1088/1748-9326/ac1f45
How fast and in what ways will the competition respond to this result?	Not predictable

Exploitable result No.2: Report on the Indicator framework for measuring the impact of policies/global drivers on IDM units in agriculture. Date: October 2021	
Which WP/Task the Exploitable Result (ER) is from?	WP1/task 1.2
Who is the Lead Partner of this result?	JRC
Which MIND STEP partners are involved in the development?	JRC, WR, UBO ,IIASA, UCSC, GEO
Please provide the main description of the result (one paragraph abstract of the result)	This report presents the indicator framework developed in MIND STEP for estimating the impact of agricultural policy measures and/or global drivers on Individual Decision Making (IDM) farm units. It includes 166 indicators currently used in agricultural policy, but also new indicators available from the models, and proposed by the stakeholders or emerging from the systematic literature review.
Please describe the innovation content of result[1]:	The main innovation is that the indicator framework – if implemented – will ensure the legitimacy of the modelling because the indicators meet simultaneously the needs of policy

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	makers, agricultural modellers and stakeholders, and is endorsed by a systematic literature review. Furthermore, the indicator framework addresses issues related to climate change, environment and competitiveness of the agricultural sector.
Does (or will) this result contribute towards European policy objectives and strategies and have an impact on policy making? How?	Yes, indirectly, by supporting the selection of relevant indicators in the modelling of the three scenarios on environmental and climate change policy measures and competitiveness in the agricultural sector, which results may provide new insights to agricultural policy making.
Does (or will) this result have an impact on SMEs?	No, not directly.
Have you protected or will you protect the IPR of this result? How? When?	No, publicly available/available for free.
What could be the barriers/risks for implementation? (Technological Risks, Partnership Risks, Market Risks, IPR/Legal Risks, Management and Financial Risks, Environmental, Regulation, Safety and Other Risks)	Data availability to assess indicators in the framework, particularly the environmental and social indicators.
Which MIND STEP partners are/will be involved in the deployment / commercialization?	Not applicable.
Where are the current and prospective markets/customers/target groups considering drivers for uptake of this ER (including users in business, education, science and policy)? (if available for free, there is no market).	No market (available for free)
What are the benefits for the customer/target group? How does the ER contribute to the expected impacts (EI) of the MIND STEP topic call RUR-04-2018 and to the relevant EU strategies?[2]	In the short term: the indicator framework provides a solid foundation for MIND STEP models to assess the impacts of policies dealing with agriculture and related natural resources, food and international trade. In the medium to long term: improvement of policy design, impact assessments and monitoring.
When is the knowledge available for exploitation?	October 2021 (Deliverable approved)

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Will there be costs incurred after the project and before exploitation (e.g. costs for training of staff, user license software (GAMS/GEMPACK)	No
What is the market size in M€ for this result and relevant trend?	Not applicable.
What are the competing, related, complementary, or overlapping, parallel projects or methods?	Especially projects working on tools to analyse impact of policies for the agricultural sector, including AGRICORE and BESTMAP.
What are the competitive advantages of MIND STEP for this result?	The indicator framework will be used as input for the data framework in WP2, the modelling work in WP3, WP4 and WP5 and for the policy evaluation in WP6. In this way, the indicator framework will ensure a harmonized and consistent use of indicators across the MIND STEP project.
How would you promote your work (to get the results used)?	Presenting it to the modellers of MIND STEP and supporting the indicator selection for the modelling. Writing a scientific paper.
How fast and in what ways will the competition respond to this result?	Not predictable.

Exploitable result No.3: Report on the conceptual framework of the MIND STEP project. Date: July 2021	
Which WP/Task the Exploitable Result (ER) is from?	WP1/task 1.3
Who is the Lead Partner of this result?	UCSC
Which MIND STEP partners are involved in the development?	UCSC, WR, UBO, IIASA, IAMO, THUENEN, WU, INRA, Ruralis, JRC, GEO
Please provide the main description of the result (one paragraph abstract of the result)	The objective of this report is to synthesize the work done for Task 1.3 that has reviewed the MIND STEP models and modelling approaches with a specific focus on their policy and farm, regional, national, EU and global driver coverage, in order to identify whether they could properly address the benchmark scenarios identified in Task 1.1. This assessment has pointed out model gaps and eventual needs of model extensions and development of new tools. At the same time, it has also revealed the potential of model integration and collaboration to supplement the outcomes of individual models e.g., improved micro-economic underpinning of aggregated models. Together, Task 1.1, Task 1.2 and Task 1.3

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	constitute the "conceptual framework" of the whole MIND STEP project, in the sense that the whole modelling and policy analysis work will refer to the identified set of policy questions, indicators and scenarios.
Please describe the innovation content of result[1]:	Definition of the "conceptual framework" of the whole MIND STEP project. This framework definition is essential for the whole modelling and policy analysis work. In fact, it will refer to the identified set of policy questions, indicators and model gaps, thus allowing realistic modelling of environmental and economic impacts of agricultural policies at farm level.
Does (or will) this result contribute towards European policy objectives and strategies and have an impact on policy making? How?	Yes, but indirect via improved and enhanced modelling efforts of environmental and climate change policy objectives to improve development of evidence-based policies.
Does (or will) this result have an impact on SMEs?	No, not directly.
Have you protected or will you protect the IPR of this result? How? When?	No, publicly available/available for free.
What could be the barriers/risks for implementation? (Technological Risks, Partnership Risks, Market Risks, IPR/Legal Risks, Management and Financial Risks, Environmental, Regulation, Safety and Other Risks)	IPR risk assessment
Which MIND STEP partners are/will be involved in the deployment / commercialization?	MIND STEP partners working on quantitative modelling
Where are the current and prospective markets/customers/target groups considering drivers for uptake of this ER (including users in business, education, science and policy)? (if available for free, there is no market).	Researchers, modellers, students, policy makers
What are the benefits for the customer/target group? How does the ER contribute to the expected impacts (EI) of the	There are indirect benefits for the target group/customer. Results from scenario definitions are used to improve modelling of models at different scales. Policy makers, producers and society will gain

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MIND STEP topic call RUR-04-2018 and to the relevant EU strategies?[2]	from more realistic analysis of economic and environmental effects at farm and sector level.
When is the knowledge available for exploitation?	July 2021 (Deliverable already approved)
Will there be costs incurred after the project and before exploitation (e.g. costs for training of staff, user license software (GAMS/GEMPACK)	None
What is the market size in M€ for this result and relevant trend?	The results of the deliverable are a public good. Everybody could use the scenario and indicators proposed for their own purposes e.g., scenario proposed can be used for modelling of economic and environmental impact of policies at different scales.
What are the competing, related, complementary, or overlapping, parallel projects or methods?	Especially projects working on tools to analyse impact of policies for the agricultural sector: AGRICORE, BESTMAP, ...
What are the competitive advantages of MIND STEP for this result?	Results of the task are in input for other MIND STEP WPs and will be directly used as input for the data framework in WP2, the modelling work in WP3, WP4 and WP5 and for the policy evaluation in WP6.
How would you promote your work (to get the results used)?	Social media promotion/CORDIS/Zenodo
How fast and in what ways will the competition respond to this result?	Not predictable

Exploitable result No.4: Final version of Interfaces for economic databases	
Which WP/Task the Exploitable Result (ER) is from?	WP 2/Task 2.4
Who is the Lead Partner of this result?	Neuenfeldt, Gocht
Which MIND STEP partners are involved in the development?	Thünen, JRC Seville
Please provide the main description of the result (one paragraph abstract of the result)	The interfaces for FADN data so far have been developed at ad-hoc basis and have not been made so far available to other potential users via clearly defined channels like GitHub, GitLab or SVN. In addition, missing documentation made it hard or impossible to adjust for the purpose of other research projects. Also, a list of use cases, which document how to use and apply the interface were missing. The interface developed in MIND STEP for

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	FADN data tries to fill this gap. It was tested with the FADN data provided in April 2021.
Please describe the innovation content of result[1]:	Interfaces is built up upon a R library approach. This includes easy installation, user manual and use case documentations.
Does (or will) this result contribute towards European policy objectives and strategies and have an impact on policy making? How?	It will contribute by avoiding double work for projects also requiring the use of FADN data. It provides routines, e.g., to convert data for time series analysis, identification of identical farms, extracting key information on agricultural land use and heard size, yields, subsidies, etc.
Does (or will) this result have an impact on SMEs?	Not applicable
Have you protected or will you protect the IPR of this result? How? When?	No
What could be the barriers/risks for implementation? (Technological Risks, Partnership Risks, Market Risks, IPR/Legal Risks, Management and Financial Risks, Environmental, Regulation, Safety and Other Risks)	Not applicable
Which MIND STEP partners are/will be involved in the deployment / commercialization?	Thünen
Where are the current and prospective markets/customers/target groups considering drivers for uptake of this ER (including users in business, education, science and policy)? (if available for free, there is no market).	Target groups are all research projects working with FADN
What are the benefits for the customer/target group? How does the ER contribute to the expected impacts (EI) of the MIND STEP topic call RUR-04-2018 and to the relevant EU strategies?[2]	Benefits: low cost of preparational work, easy to adjust because open and in R format.
When is the knowledge available for exploitation?	Is already public at GITLAB

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Will there be costs incurred after the project and before exploitation (e.g. costs for training of staff, user license software (GAMS/GEMPACK)	The documentation is available. Training might speed up the process in putting it into a particular context.
What is the market size in M€ for this result and relevant trend?	Not applicable
What are the competing, related, complementary, or overlapping, parallel projects or methods?	So far, no interface exists in this format
What are the competitive advantages of MIND STEP for this result?	All partners build up on our expertise when start working with FADN
How would you promote your work (to get the results used)?	Publication on GIT
How fast and in what ways will the competition respond to this result?	Not applicable

Exploitable result No.5: Literature review of methods for linking economic and bio-physical databases. Date: April 2021	
Which WP/Task the Exploitable Result (ER) is from?	WP2/Task 2.5
Who is the Lead Partner of this result?	Thünen
Which MIND STEP partners are involved in the development?	Thünen, JRC
Please provide the main description of the result (one paragraph abstract of the result)	This report summarizes the literature in the field of linking economic and bio-physical data at farm level. Recent CAP reforms have introduced farm-specific measures whose uptake and economic and environmental effects differ significantly between individual farms. For some indicators the farm location and accurate information of bio-physical endowments of the farm is necessary, e.g., soil erosion, landscape diversity, biodiversity or GHG emissions. However, a general limitation is that although often collected, spatial location of the farms in underlying databases are not available due to confidentiality regulations. This report provides a review of existing approaches to overcome this problem.

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Please describe the innovation content of result[1]:	Most recent literature review that has been conducted about this topic. Essential for realistic modelling of environmental and economic impacts of agricultural policies at farm level.
Does (or will) this result contribute towards European policy objectives and strategies and have an impact on policy making? How?	Yes, but indirect via improved and enhanced linking of biophysical data to economic farm data to improve development of evidence-based policies.
Does (or will) this result have an impact on SMEs?	No, not directly.
Have you protected or will you protect the IPR of this result? How? When?	No, publicly available/available for free.
What could be the barriers/risks for implementation? (Technological Risks, Partnership Risks, Market Risks, IPR/Legal Risks, Management and Financial Risks, Environmental, Regulation, Safety and Other Risks)	IPR risk assessment
Which MIND STEP partners are/will be involved in the deployment / commercialization?	MIND STEP partners working on quantitative modelling
Where are the current and prospective markets/customers/target groups considering drivers for uptake of this ER (including users in business, education, science and policy)? (if available for free, there is no market).	Researchers, modellers, students, policy makers
What are the benefits for the customer/target group? How does the ER contribute to the expected impacts (EI) of the MIND STEP topic call RUR-04-2018 and to the relevant EU strategies?[2]	There are indirect benefits for the target group/customer. Results from literature review are used to improve data and modelling of models at different scales. Policy makers, producers and society will gain from more realistic analysis of economic and environmental effects at farm and sector level.
When is the knowledge available for exploitation?	April 2021 (Due date of the deliverable)
Will there be costs incurred after the project and before	None (literature review)

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exploitation (e.g. costs for training of staff, user license software (GAMS/GEMPACK)	
What is the market size in M€ for this result and relevant trend?	The literature review is a public good. Everybody could use the approaches and methodologies discussed in the literature review for their own purposes e.g. results can be used for improved modelling of economic and environmental impact of policies at different scales.
What are the competing, related, complementary, or overlapping, parallel projects or methods?	Especially projects working on tools to analyse impact of policies for the agricultural sector: SUPREMA consortium, AGRICORE, BESTMAP, ...
What are the competitive advantages of MIND STEP for this result?	Results of the literature review are directly used by new IDM and ABM in WP3 and WP4 of MIND STEP. Results can also be used for downscaling of the results of the more aggregated models.
How would you promote your work (to get the results used)?	Social media promotion/CORDIS/Zenodo
How fast and in what ways will the competition respond to this result?	Not predictable

Exploitable result No.6: Database for linking economic and bio-physical data	
Which WP/Task the Exploitable Result (ER) is from?	WP 2/Task 2.7/8
Who is the Lead Partner of this result?	JRC
Which MIND STEP partners are involved in the development?	Thünen
Please provide the main description of the result (one paragraph abstract of the result)	Estimation framework to spatially allocate FADN farms
Please describe the innovation content of result[1]:	The innovation is the development of software for linking economic and bio-physical data. Although often collected, spatial location of the farms in underlying databases are not available due to confidentiality regulations. This is also the case for the data base FADN used in MINDSTEP to develop single farm models and modules. The software uses land use shares and expected yields in the spatial unit and their counterparts in FADN to allocate FADN farms with a certain probability and hence respecting the confidentiality regulations. It consists of software

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	in GAMS and JAVA and a practical manual how to use the allocation software for their one set of FADN data.
Does (or will) this result contribute towards European policy objectives and strategies and have an impact on policy making? How?	With this FADN based impact assessment can be linked to environmental indicators from spatial data sets.
Does (or will) this result have an impact on SMEs?	No applicable
Have you protected or will you protect the IPR of this result? How? When?	No
What could be the barriers/risks for implementation? (Technological Risks, Partnership Risks, Market Risks, IPR/Legal Risks, Management and Financial Risks, Environmental, Regulation, Safety and Other Risks)	Not applicable
Which MIND STEP partners are/will be involved in the deployment / commercialization?	Thünen
Where are the current and prospective markets/customers/target groups considering drivers for uptake of this ER (including users in business, education, science and policy)? (if available for free, there is no market).	All parties working with FADN data and spatial data, i.e., national agencies, EU Com JRC, Horizon projects etc.
What are the benefits for the customer/target group? How does the ER contribute to the expected impacts (EI) of the MIND STEP topic call RUR-04-2018 and to the relevant EU strategies?[2]	The development of the software for linking economic and bio-physical could influence the different choices of agricultural policy instruments and novel design specifications that address problems of sustainability in farming more effectively and possibly more efficiently
When is the knowledge available for exploitation?	Feb. 2022
Will there be costs incurred after the project and before exploitation (e.g. costs for	GAMS license

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training of staff, user license software (GAMS/GEMPACK)	
What is the market size in M€ for this result and relevant trend?	I don't know
What are the competing, related, complementary, or overlapping, parallel projects or methods?	No competition
What are the competitive advantages of MIND STEP for this result?	Linking IDMs to spatial data (also remote sensing data)
How would you promote your work (to get the results used)?	Paper, GIT
How fast and in what ways will the competition respond to this result?	Not applicable

Exploitable result No.7: Develop an overarching model structure (report) for modelling IDM farm units in the agricultural sector together with parallel working consortia. Date: December 2022	
Which WP/Task the Exploitable Result (ER) is from?	WP 3/Task 3.2
Who is the Lead Partner of this result?	WR
Which MIND STEP partners are involved in the development?	WR, WUR, INRA-E, Thünen,UCSC
Please provide the main description of the result (one paragraph abstract of the result)	The definition of a core IDM simulation model to which the methods and results from the other tasks in WP3 can be added in a modular manner. The modular, core IDM simulation model is first applied to case study sectors and regions. The split of data and model code will allow application of the core IDM simulation model to other regions and sectors in the EU as well.
Please describe the innovation content of result[1]:	The protocols as conceptualized in the programming tableaus in deliverable 3.1 will be implemented such that the new IDM models and methods developed in tasks 3.3, 3.4, and 3.5 can be connected as modules to a core IDM simulation model like IFM-CAP or FARMDYN. Task 3.3 extends the set of technology options included in the core IDM simulation model to mitigate climate change. The new IDM models developed in Task 3.4 deliver technical and behavioural parameters estimated at farm level i.e. input use, substitution between fodder crops and pastures and

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	adjustment costs associated with investments. Task 3.5 allows incorporating empirically estimated farm specific risk behaviour into the core IDM simulation model.
Does (or will) this result contribute towards European policy objectives and strategies and have an impact on policy making? How?	Yes, the core detailed IDM simulation model will contribute to bottom-up simulations of policy measures and objectives as included the EU CAP, Green deal and Farm to Fork strategy. The models can be used by the partners for farm level analysis in the different member states of the EU. The modular IDM simulation model will be used for policy evaluation in the EU H2020 project MINDSTEP for farm level results and will be the base for upscaling towards the market models. The modular IDM simulation model will be available to other researchers in the EU.
Does (or will) this result have an impact on SMEs?	Yes. The detailed core IDM simulation can be used to optimise farm management under changing economic conditions. If the model is used for decision making regarding policies relevant for the agricultural sector, it will indirectly effect decision making at farm level.
Have you protected or will you protect the IPR of this result? How? When?	No.
What could be the barriers/risks for implementation? (Technological Risks, Partnership Risks, Market Risks, IPR/Legal Risks, Management and Financial Risks, Environmental, Regulation, Safety and Other Risks)	The detailed, modular, core IDM simulation model requires data that is not always available in the different regions and member states of the EU. To overcome this problem default data can be provided and applications can focus on aspects that can be more easily analysed.
Which MIND STEP partners are/will be involved in the deployment / commercialization?	Potentially all MIND STEP partners will gain experience with the core IDM simulation model with modular integration of the econometric models in WP3 as these models will be the base for upscaling to market models. All partners will contribute to deployment/commercialization.
Where are the current and prospective markets/customers/target groups considering drivers for uptake of this ER (including users in business, education, science and policy)? (if available for free, there is no market).	The target group and potential customers are everybody working in the field of agriculture: farmers, processors, input suppliers, policy makers, NGOs, researchers, modellers, students.
What are the benefits for the customer/target group? How does the ER contribute to the expected impacts (EI) of the	Improved farm management decisions, more realistic ex-ante impact assessments of policy measures resulting into more efficient policies and policy making regarding the key EU

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MIND STEP topic call RUR-04-2018 and to the relevant EU strategies?[2]	strategies. Policy makers, producers and society might gain from this.
When is the knowledge available for exploitation?	December 2022.
Will there be costs incurred after the project and before exploitation (e.g. costs for training of staff, user license software (GAMS/GEMPACK)	To learn the system, adjust data interfaces and to apply the system to specific cases and sectors, require experience with modelling and underlying hard- and software. Given the complexity the entry costs will be relatively high
What is the market size in M€ for this result and relevant trend?	Potentially large for the MINDSTEP partners that are able to work with the detailed, modular core IDM model and interested to train other researchers to apply the models in different regions of the EU.
What are the competing, related, complementary, or overlapping, parallel projects or methods?	Especially other researchers working in the field of farm level modelling, GHG mitigation options, land use, adoption of risk management measures and upscaling to market models.
What are the competitive advantages of MIND STEP for this result?	In MINDSTEP the detailed , modular, core IDM model will be used to improve micro-economic underpinning of the market models in WP5. It will also be the base of the policy evaluation in WP6.
How would you promote your work (to get the results used)?	Social media promotion/CORDIS/Zenodo
How fast and in what ways will the competition respond to this result?	Not yet defined

Exploitable result No.8: Report on modelling a structural change / strategic behaviour / farm exit model. Date: December 2022	
Which WP/Task the Exploitable Result (ER) is from?	WP 4/Task 4.2
Who is the Lead Partner of this result?	Thünen
Which MIND STEP partners are involved in the development?	Thünen
Please provide the main description of the result (one paragraph abstract of the result)	The estimated exit decision probabilities will be used in the current land market model (Subtask 5.2.3) to account for structural change. We implement the developments of this Task for at least ten selected regions compatible with the farm exit estimations.

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Please describe the innovation content of result[1]:	Exit probability estimations to be used in another model (Subtask 5.2.3) to account for structural change (exits).
Does (or will) this result contribute towards European policy objectives and strategies and have an impact on policy making? How?	Yes, but indirect by enhancing land market model capacities (Subtask 5.2.3).
Does (or will) this result have an impact on SMEs?	No, not directly.
Have you protected or will you protect the IPR of this result? How? When?	No.
What could be the barriers/risks for implementation? (Technological Risks, Partnership Risks, Market Risks, IPR/Legal Risks, Management and Financial Risks, Environmental, Regulation, Safety and Other Risks)	No.
Which MIND STEP partners are/will be involved in the deployment / commercialization?	MIND STEP partners working with the land market model (Subtask 5.2.3).
Where are the current and prospective markets/customers/target groups considering drivers for uptake of this ER (including users in business, education, science and policy)? (if available for free, there is no market).	Researchers, modellers, students.
What are the benefits for the customer/target group? How does the ER contribute to the expected impacts (EI) of the MIND STEP topic call RUR-04-2018 and to the relevant EU strategies?[2]	There are indirect benefits for the target group/customer. Results from the estimations are used to improve land market model and might be interesting in general. Policy makers, producers and society might gain from more realistic analysis of economic and environmental effects at farm and sector level.
When is the knowledge available for exploitation?	December 2022.
Will there be costs incurred after the project and before exploitation (e.g. costs for	There is an access fee to use German agricultural survey data.

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training of staff, user license software (GAMS/GEMPACK)	
What is the market size in M€ for this result and relevant trend?	The exit estimations are a public good. Everybody could use the approaches and methodologies discussed in the task for their own purposes e.g. results can be used for improved modelling of economic and environmental impact of policies at different scales.
What are the competing, related, complementary, or overlapping, parallel projects or methods?	Especially other researchers working on the topic of farm exits and structural change.
What are the competitive advantages of MIND STEP for this result?	Results are used in Subtask 5.2.3.
How would you promote your work (to get the results used)?	Social media promotion/CORDIS/Zenodo
How fast and in what ways will the competition respond to this result?	Not yet defined

Exploitable result No.9: Report on extensions of Farm AgriPoliS and experimental insights with FarmAgriPoliS on farmers' response to Rural Development measures and opportunities and interfaces with the MIND STEP model toolbox (M40)	
Which WP/Task the Exploitable Result (ER) is from?	WP 4/Task 4.3
Who is the Lead Partner of this result?	IAMO
Which MIND STEP partners are involved in the development?	IAMO
Please provide the main description of the result (one paragraph abstract of the result)	The AES-tool allows players of FarmAgriPoliS (a didactic tool described in more detail under https://www.iamo.de/en/research/projects/details/farmagripolis-20/) to to decide on the participation in collective Agri-Environmental Schemes. During a game, players have the option to participate in AES by using part of their pasture extensively for five years (i.e. as collective regional biodiversity management). For this time they receive a collective payment which means that the more farms participating in the collective AES, the better the effect of the environmental measure, the higher the payment for each farm. With this new tool for FarmAgriPoliS players can realistically simulate the strategic decision of participating in collective AES for their farm's development. The decision will be made on the one hand against the background of regional

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	conditions, prices and policy uncertainty, and the behaviour of other farms in the region on the other hand.
Please describe the innovation content of result[1]:	The provision of AES-tool for FarmAgriPoliS allows students (master level agricultural economics) to study and discuss the potentials of collective Agri-Environmental Schemes and their structural and financial effects.
Does (or will) this result contribute towards European policy objectives and strategies and have an impact on policy making? How?	Not directly
Does (or will) this result have an impact on SMEs?	Potentially. Many students of agricultural economics are farm successors and therefore the next generation of farm managers. This is especially the case for students at universities of applied sciences
Have you protected or will you protect the IPR of this result? How? When?	No, publicly available/available for free.
What could be the barriers/risks for implementation? (Technological Risks, Partnership Risks, Market Risks, IPR/Legal Risks, Management and Financial Risks, Environmental, Regulation, Safety and Other Risks)	Management and Financial Risks (time constraints due to other projects tasks)
Which MIND STEP partners are/will be involved in the deployment / commercialization?	IAMO
Where are the current and prospective markets/customers/target groups considering drivers for uptake of this ER (including users in business, education, science and policy)? (if available for free, there is no market).	Lecturers and students (master level agricultural economics)
What are the benefits for the customer/target group? How does the ER contribute to the expected impacts (EI) of the MIND STEP topic call	Instead of just theoretically learning about structural change, effects of various agricultural policy scenarios and the potentials of collective AES from others, the simulation game allows the players a direct and intuitive access: The short- and longer-term impact of their own decisions are experienced directly at their

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RUR-04-2018 and to the relevant EU strategies?[2]	own model farm as well as in comparison to other farms in the region.
When is the knowledge available for exploitation?	End of 2022
Will there be costs incurred after the project and before exploitation (e.g. costs for training of staff, user license software (GAMS/GEMPACK)	Additional time and financial resources are needed to make the new FarmAgriPoliS version (witch collective Agri-Environmental Schemes) available online and additional in English.
What is the market size in M€ for this result and relevant trend?	Public money – public good
What are the competing, related, complementary, or overlapping, parallel projects or methods?	AgriPoliS is a complementary method.
What are the competitive advantages of MIND STEP for this result?	Visability, Transfer
How would you promote your work (to get the results used)?	https://www.farmagripolis.de/en/home/ , Social Media
How fast and in what ways will the competition respond to this result?	Not predictable

Exploitable result No.10: Report to model the supply chain mechanisms and the bargaining position of farmers along the chain and interfaces with MIND STEP model toolbox	
Which WP/Task the Exploitable Result (ER) is from?	WP 4/Task 4.4
Who is the Lead Partner of this result?	UCSC
Which MIND STEP partners are involved in the development?	UCSC, Thünen
Please provide the main description of the result (one paragraph abstract of the result)	The main outcome of task 4.4 will be the estimation of market power and price transmission parameters for some agri-food chains where farmers may be endowed with a certain degree of bargaining power thanks to the development of specific coordination tools, such as producers' organization or contracts. Even though these parameters will be estimated for specific supply chains (e.g., the pork and tomatoes processing chains in Italy), the general framework that will be developed can be easily extended to other agri-food chains and improve the

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	corresponding parameters in current models and platforms (e.g., CAPRI, MAGNET).
Please describe the innovation content of result[1]:	In most of the theoretical and empirical work on price transmission and market power along agri-food chains the farm sector is assumed to be perfectly competitive. However, this assumption may be implausible in modern food markets, where farmers increasingly achieve some extent of market power through the use of vertical contractual agreements and/or the creation of producers' organization. Therefore, extending traditional NEIO models, such as the conjectural variations approach (Appelbaum 1982), by incorporating these new features of agri-food supply chains is essential to correctly evaluate the potential effects of different policies or market shocks on market and agricultural prices and on farm incomes.
Does (or will) this result contribute towards European policy objectives and strategies and have an impact on policy making? How?	Supporting farmers in the creation of producers' organization is one of the key actions taken by the European Commission in order to contrast unfair business practices in the food chain by strengthening the agricultural sector bargaining position (EC). In addition, as this intervention has proven its effectiveness in the past for the fruit and vegetable sectors, the new CAP 2023-2027 will further extend the support for the creation of producer organizations to all agricultural sectors. Therefore, the results from this analysis will contribute to the EU policy objectives by improving the understanding and parametrization of vertical coordination tools in agri-food chain. The estimated parameters can then be used to simulate questions, like whether a better market integration will lead to similar or better market outcomes and incomes for the agricultural sector, and so, to assess the potential impacts of policies which enable a more balanced position of farmers in the chain.
Does (or will) this result have an impact on SMEs?	Not directly, but farms are potential beneficiary of policy changes
Have you protected or will you protect the IPR of this result? How? When?	No, publicly available/available for free.
What could be the barriers/risks for implementation? (Technological Risks, Partnership Risks, Market Risks, IPR/Legal Risks, Management and Financial Risks, Environmental, Regulation, Safety and Other Risks)	The main barrier for the development of our model is data availability for the market conduct parameters' estimation. While price data at different stages of the supply chain are usually widely available (e.g., retail scanner data, chambers of commerce data), one challenge that one could face is to collect data about costs for all the market players (i.e., farmers, food processors and retailers) as these are usually not observed by the econometrician. One potential approach to overcome this issue is to collect cost data from different data sources.
Which MIND STEP partners are/will be involved in the	MIND STEP partners working on quantitative modelling

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deployment / commercialization?	
Where are the current and prospective markets/customers/target groups considering drivers for uptake of this ER (including users in business, education, science and policy)? (if available for free, there is no market).	Researchers, students, policy-makers.
What are the benefits for the customer/target group? How does the ER contribute to the expected impacts (EI) of the MIND STEP topic call RUR-04-2018 and to the relevant EU strategies?[2]	The results from this analysis can be used to improve the parameters used in current models and platforms, and so, to better model policies affecting the agricultural sector and assess policy impacts.
When is the knowledge available for exploitation?	End of 2022
Will there be costs incurred after the project and before exploitation (e.g. costs for training of staff, user license software (GAMS/GEMPACK)	None
What is the market size in M€ for this result and relevant trend?	It is a public good, available for users
What are the competing, related, complementary, or overlapping, parallel projects or methods?	Potentially, other projects that focus on modelling the strategic behaviour of agents involved in agri-food chains, such as AGRICORE, BESTMAP, MACSUR, etc…
What are the competitive advantages of MIND STEP for this result?	Work of different modelling teams, with different approaches and different modelling experiences
How would you promote your work (to get the results used)?	Academic publication, Conference presentation, Linkedin and other social media.
How fast and in what ways will the competition respond to this result?	As for any academic research work, once results are published, replicability and extensions become possible

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Exploitable result No.11: Surrogate Model of the Complex IDM FarmDyn Using Deep Neural Networks	
Which WP/Task the Exploitable Result (ER) is from?	WP 4/Task 4.5
Who is the Lead Partner of this result?	UBO
Which MIND STEP partners are involved in the development?	UBO, IAMO
Please provide the main description of the result (one paragraph abstract of the result)	The main result will be a surrogate model of the IDM that approximates the behaviour of FarmDyn using Deep Neural Networks (DNNs). Further, we integrate this surrogate model in the ABM model AgriPoliS. The integrated model can be used for policy scenario analysis capturing detailed input use, technology choices and environmental impacts on farm level, as well as interaction among farmers and market feedback on regional level. The surrogate model of FarmDyn can also be applied in other large-scale models. The advantage of using a surrogate model instead of the original model is that the runtime is faster, no licencing cost for the software that runs FarmDyn (GAMS) is required, and that the input data and hence access rights of the data used in FarmDyn do not need to be transferred.
Please describe the innovation content of result[1]:	Surrogate models based on DNN are not used in the agricultural economics modelling. Within this project we aim to provide a proof of concept and a first application using surrogate model to link to existing models (FarmDyn and AgripoliS) that are so for not possible to link.
Does (or will) this result contribute towards European policy objectives and strategies and have an impact on policy making? How?	Yes, this result could have an impact on policy making on EU level. The research region of the integrated model is Rheinisches Revier (Germany), in which impacts of EU agricultural policy are simulated. The policy analysis and conclusions of this research region could provide insights on policy making on EU level.
Does (or will) this result have an impact on SMEs?	No, not directly.
Have you protected or will you protect the IPR of this result? How? When?	No, publicly available/available for free
What could be the barriers/risks for implementation? (Technological Risks, Partnership Risks, Market Risks, IPR/Legal Risks, Management and Financial Risks, Environmental,	Technological Risks: Specifying clear model interfaces that allow to link models is challenging. Applying the surrogate model and working with the integrated model requires modellers to have profound knowledge on programming (GAMS, python and C++) and agricultural economic modelling.

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Regulation, Safety and Other Risks)	
Which MIND STEP partners are/will be involved in the deployment / commercialization?	MIND STEP partners working on quantitative modelling
Where are the current and prospective markets/customers/target groups considering drivers for uptake of this ER (including users in business, education, science and policy)? (if available for free, there is no market).	Researchers, modellers, students, policy makers
What are the benefits for the customer/target group? How does the ER contribute to the expected impacts (EI) of the MIND STEP topic call RUR-04-2018 and to the relevant EU strategies?[2]	Researchers can use the surrogate model in other agricultural policy models. The integrated model can be used to assess agricultural policies aiming to improve the sustainability (economic, social and environmental) of the farming system. The insights gained from using the ER can contribute the relevant EU strategies in turn.
When is the knowledge available for exploitation?	End of December 2023 (Due date of the deliverable)
Will there be costs incurred after the project and before exploitation (e.g. costs for training of staff, user license software (GAMS/GEMPACK)	costs for training of staff, user license software (GAMS/GUROBI solver)
What is the market size in M€ for this result and relevant trend?	The integrated model is a public good. Every one could access it.
What are the competing, related, complementary, or overlapping, parallel projects or methods?	None
What are the competitive advantages of MIND STEP for this result?	Building surrogate models and linking models together required modellers to have knowledge on programming (GAMS, python and C++), deep learning as well as a detailed knowledge of the underlying models (FarmDyn/AgriPoliS). MIND STEP has the advantage of bringing together qualified researchers for the core groups maintaining FarmDyn and AriPoliS, as well as expertise on using deep learning in an agricultural economics context.
How would you promote your work (to get the results used)?	Provide the code to train the surrogate model in an open access repository; Use it as a teaching tool for PhD and master students; social media promotion/CORDIS/Zenodo

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How fast and in what ways will the competition respond to this result?	Relatively slow, since this innovation requires cooperation from modellers of different scales, programming skills (C++, python and GAMS), and profound knowledge on agricultural economic modelling.

Exploitable result No.12: MIND STEP model toolbox. Date: M44	
Which WP/Task the Exploitable Result (ER) is from?	WP5 / Task 5.1, 5.2, 5.3
Who is the Lead Partner of this result?	IIASA
Which MIND STEP partners are involved in the development?	IIASA, WR, UBO, UCSC, WU, INRA, NIBIO, JRC
Please provide the main description of the result (one paragraph abstract of the result)	MIND STEP model toolbox integrates the tools focusing on the individual farmer and the tools focussing on interaction among farmers and within the supply chain with the tools used at the European Commission, those gathered in the SUPREMA modelling platform to allow for consistent assessment of global events and EU policies across different geographical scales – from regional to global.
Please describe the innovation content of result[1]:	Toolbox introduces applies procedures for upscaling IDM models incl. via development of meta-models to overcome complexities related to the large number of agents and interactions. Innovative methodologies for linkages between the IDM models and the current models in two directions: Bottom-up (Improvement of current tools used at the European Commission) and Top-down (Downscaling of current model results to provide scenario relevant input to IDM models and complement the assessment for questions or geographies not covered by IDM models.)
Does (or will) this result contribute towards European policy objectives and strategies and have an impact on policy making? How?	Improving and augmenting the tools already used for policy impact assessment, by the European Commission, particularly DG AGRI, but also other DGs, and integrating them with innovative modelling approaches will enhance the effectiveness and efficiency of European policy making.
Does (or will) this result have an impact on SMEs?	No, not directly.
Have you protected or will you protect the IPR of this result? How? When?	No, publicly available/available for free.
What could be the barriers/risks for implementation? (Technological Risks, Partnership Risks, Market Risks, IPR/Legal Risks,	IPR risk assessment. Insufficient uptake by the European Commission and other stakeholders. However minimal, because of the long track of successful collaboration, and use and development of the toolbox components directly by JRC.

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Management and Financial Risks, Environmental, Regulation, Safety and Other Risks)	
Which MIND STEP partners are/will be involved in the deployment / commercialization?	MIND STEP partners working on quantitative modelling
Where are the current and prospective markets/customers/target groups considering drivers for uptake of this ER (including users in business, education, science and policy)? (if available for free, there is no market).	Policy makers (EC: DG AGRI, DG TRADE, DG CLIMA, DG ENV, national agencies), researchers, modellers, students
What are the benefits for the customer/target group? How does the ER contribute to the expected impacts (EI) of the MIND STEP topic call RUR-04-2018 and to the relevant EU strategies?[2]	The MIND STEP model toolbox includes the current models and bottom-up IDM models, focusing on behaviour of individual farmers and biophysical constraints, for more accurate and evidence-based modelling of policies dealing with agriculture from farm to sector and from local to global. The MIND STEP model toolbox can be used to test and brainstorm on new type of (regional) policies and policy measures. As a result, policy makers can take decisions upon policies that influence agriculture (CAP, Environmental, Climate etc.) based on robust and realistic model simulations. Via data and model imputation the MIND STEP model toolbox showcases the usefulness of data availability to regions, therefore providing an incentive to MS to improve data collection in other regions.
When is the knowledge available for exploitation?	M44 (Due date of the deliverable)
Will there be costs incurred after the project and before exploitation (e.g. costs for training of staff, user license software (GAMS/GEMPACK)	Software licenses (GAMS/GEMPACK). Cost of experts implementing the models.
What is the market size in M€ for this result and relevant trend?	There is an increasing demand for quantitative modelling in support of policy development and implementation at the Eu level. In addition, the new structure of CAP largely relying on the national CAP Strategic Plans represents a new market for national level implementation of the Toolbox. Estimated size: 30 M€
What are the competing, related, complementary, or overlapping, parallel projects or methods?	Especially projects working on tools to analyse impact of policies for the agricultural sector: SUPREMA consortium, AGRICORE, BESTMAP, ...

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What are the competitive advantages of MIND STEP for this result?	The balanced mix of well-established large-scale models and highly innovative ground-based micro-models.
How would you promote your work (to get the results used)?	To make the toolbox attractive and useful for policy makers, it needs to be understandable, trusted, customisable, flexible in use and easy to improve as needs arise. MIND STEP investigates with regional, national and EU policy makers, farmers, food industry, and other stakeholders what makes a model attractive and useful and therefore can make policy tasks easier. Working together with mentioned stakeholders in the field of model development and applications to case studies, from local to global is a further innovation of MIND STEP. At regional and national level MIND STEP investigates with policy makers and other stakeholders how they can use the MIND STEP model toolbox to do their own analysis based on own configuring and parameterisation of models. Hence the stakeholders participate in the development of the models. In addition, trainings are provided.
How fast and in what ways will the competition respond to this result?	Not predictable

Exploitable result No.13: Report on options for quality management, validation requirements & suitability of validation tools (Date: December 2021)	
Which WP/Task the Exploitable Result (ER) is from?	WP6/Task 6.1
Who is the Lead Partner of this result?	IAMO
Which MIND STEP partners are involved in the development?	IAMO
Please provide the main description of the result (one paragraph abstract of the result)	The report presents different approaches to model validation with a specific focus on simulation models including agent-based approaches. Options, procedures, and challenges for model validation are discussed and a checklist with quality criteria and indicators for model validation is derived from the literature and adjusted for the specific needs within the MIND STEP project. This checklist will serve as a mean of quality management within MIND STEP. While most criteria, e.g., concerning different aspects of documentation and validation are commonly relevant in other frameworks, modularity or the potential to link different models is a specific feature of the MIND STEP project.
Please describe the innovation content of result[1]:	Options and challenges of model validation are presented.
Does (or will) this result contribute towards European	No

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policy objectives and strategies and have an impact on policy making? How?	
Does (or will) this result have an impact on SMEs?	No
Have you protected or will you protect the IPR of this result? How? When?	No, publicly available/available for free.
What could be the barriers/risks for implementation? (Technological Risks, Partnership Risks, Market Risks, IPR/Legal Risks, Management and Financial Risks, Environmental, Regulation, Safety and Other Risks)	Not applicable
Which MIND STEP partners are/will be involved in the deployment / commercialization?	Not applicable
Where are the current and prospective markets/customers/target groups considering drivers for uptake of this ER (including users in business, education, science and policy)? (if available for free, there is no market).	Researchers, modellers, students, policy makers
What are the benefits for the customer/target group? How does the ER contribute to the expected impacts (EI) of the MIND STEP topic call RUR-04-2018 and to the relevant EU strategies?[2]	The development, application, and validation of the MIND STEP toolbox are transparent, and the result of this deliverable shall help to better understand the MIND STEP toolbox approach and eventually (together with subsequent tasks in this work package) educate stakeholders and build trust in the models.
When is the knowledge available for exploitation?	December 2021 (Submission of Deliverable D6.1)
Will there be costs incurred after the project and before exploitation (e.g. costs for training of staff, user license software (GAMS/GEMPACK)	No
What is the market size in M€ for this result and relevant trend?	Not applicable (public good)

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What are the competing, related, complementary, or overlapping, parallel projects or methods?	Projects/groups working on tools to analyse impact of policies for the agricultural sector (e.g., AGRICORE or BESTMAP)
What are the competitive advantages of MIND STEP for this result?	Because of the very nature of the MIND STEP project, i.e., the combination of models and approaches from different perspectives and spatial scales, validation is also based on an extensive toolbox, including external stakeholder engagement.
How would you promote your work (to get the results used)?	Social media, scientific conferences
How fast and in what ways will the competition respond to this result?	Not predictable

5. MANAGEMENT OF INTELLECTUAL PROPERTY RIGHTS

Each partner has an **obligation to protect its results** and must adequately protect them — for an appropriate period and with appropriate territorial coverage — if the results can reasonably be expected to be commercially or industrially exploited, and any other possible, reasonable and justified circumstance. When deciding on protection, the partner must consider its own legitimate interests and the legitimate interests (especially commercial) of the other beneficiaries.

Effective exploitation of the exploitable results depends, among others, on the **proper management of intellectual property**, which should be part of the overall management of knowledge in the project.

During the entire project, specific actions have been and will be undertaken for properly addressing the issues related to the intellectual property rights, such as pre-existing knowledge of the project partners, an assessment of the results generated during the project, proposition of the optimal IPR protection options, ownership and proper implementation of IPR protection measures.

The framework of the IPR management is set out within the Consortium Agreement, which stipulates the rules related to the following IP issues:

- Identification of the pre-existing knowledge (Background) and the specific limitations and conditions for its implementation;
- Ownership of the Results;
- Transfer of the Results;
- Access rights to the Background and the Results;
- Non-disclosure of the information.

5.1. Protection of results

Beneficiaries must assess the possibility of protecting their results once these are generated. Should the results be reasonably expected to be commercially or industrially exploited and their protection possible, reasonable and justified, then the beneficiaries must provide for adequate protection of the results during an appropriate period and in a suitable territory.

The beneficiaries are in principle free to choose any available form of protection.

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Standard forms of protection are as follows:

- Patent
- Trademark
- Industrial design
- Copyright
- Trade-secret
- Confidentiality

The choice of the most suitable form of IP protection, as well as the duration and geographical coverage depends on the results at stake (is it an invention, software or a database?), but also the business plans for their exploitation and legitimate interests of consortium partners.

Although it is not mandatory to inform other partners about the protection activities, it is considered **good practice** to consult with them before deciding whether to protect their own results or not – particularly if it concerns potentially joint IP.

Table 1: Examples of IP protection choice according to the type of result[1]

Subject matter	Patent	Utility model	New (industrial) Design	Copyright	Trademark	Confidential information
Invention	x	x				x
Software	x			x		x
Scientific article				x		
Design of a product			x	x	x	
Name of a product/service/project					x	
Know-how						x
Website			x	x	x	

Although IP **protection** is vital for a prospective commercial or industrial exploitation, on the other hand it **is not always mandatory**.

No protection is necessary if protection is impossible under EU or national law or not justified in view of the (potential) commercial or industrial exploitation, the action's objective and other relevant elements, such as potential markets and countries in which competitors are located, whether additionally protecting a part of certain technology would bring significantly broader protection or not, etc.)

What to consider when deciding not to protect results?

Where a participant does not intend to protect a result, it is also best practice to **consider offering to transfer it** to other consortium partners or third parties, better positioned for the exploitation of the results and willing to seek their protection.

If such transfer is not done, participants that have received European Union funding but do not intend to protect their results which are capable of industrial or commercial application for reasons other than legal impossibility, must be careful **not to perform any dissemination activities without first informing the European Commission**. This notification is mandatory up to four years after the end of the project.

[1] *Source: IPR Helpdesk*

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The European Commission may decide, with the consent of the participant to whom the result belongs to, to assume ownership and take the necessary measures to protect it. In this case, the Commission must formally notify the concerned participant within 45 days of receiving the notification.

IP protection has been considered for the currently identified KERs and indicated in their assessment in section 4.1 above. Nevertheless, a detailed assessment, also in light of the individual exploitation plans of the partners, will be made in the next phase of the project and will be included in the Final Exploitation Strategy and Plan (D8.6).

6. CONCLUSIONS

The aim of this deliverable is to provide a first version of the Exploitation Strategy and Plan for the MIND STEP project results. It comprises a first assessment of the key exploitable results (KERs) and of the ways and modes of how the consortium intends to prepare for creating the post-project legacy. This will be by use of the results, or promoting the results, for use by stakeholders and other actors outside the consortium, and thereby creating impacts.

The preparation for exploitation is an iterative process that comes to the fore when project results are emerging. Accordingly, the Exploitation Strategy and Plan will be updated as the project completes its final stages to ensure dynamic and successful exploitation of project results, avoid infringement of Intellectual Property Rights and mitigate risks that could endanger the exploitation of results.

To this end, GEO will continue to secure the involvement of all project partners in exploitation activities, guide them through the process and encourage them to contribute to the exploitation. The Stakeholder Advisory Board (SAB) will also be consulted for feedback.

This draft Exploitation Strategy and Plan will be followed by an adapted, operational Exploitation Plan in Month 52 (Deliverable D8.6), which will outline the final strategy and plan for exploiting the results of MIND STEP after the end of the project. The iterative process during the remainder of the project will use sessions of partner meetings which are dedicated to exploitation which will lead to D8.6. This will include reviewing, updating and finalising the KERs, the overall project and partner level exploitation strategies and plans, and a detailed assessment of potential exploitation impacts as well as the sustainability aspects.

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