MIND STEP

MODELLING INDIVIDUAL DECISIONS TO SUPPORT THE EUROPEAN POLICIES RELATED TO AGRICULTURE

Deliverable D 2.1: Summary of required data from WP 3/4/5

AUTHORS	Gocht, Alexander (THÜNEN), Sebastian Neuenfeldt (THÜNEN)
APPROVED BY WP MANAGER:	Gocht, Alexander (THÜNEN)
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ACRONYMS

Agripolis	Agricultural Policy Simulator
CAPDIS	CAPRI data spatially disaggregated
CAPRI	Common Agricultural Policy Regionalised Impact Modelling System
CORINE	Coordination of Information on the Environment
DEM	Digital Elevation Data
DG-AGRI	The Commission's Directorate-General for Agriculture and Rural Development
FADN	Farm Accountancy Data Network
FARMDYN	A dynamic mixed integer bio-economic farm scale model
FSS	Farm Structure Survey
GLOBIOM	The Global Biosphere Management Model
IIASA	International Institute for Applied Systems Analysis
IACS	Integrated Administration and Control System
IDM	Individual decision making
IFM-CAP	Individual Farm Model for Common Agricultural Policy Analysis
JRC	Joint Research Centre
KWIN	Kwantitatieve Informatie voor de Akkerbouw (Dutch management data)
KTBL	Kuratorium für Technik und Bauwesen in der Landwirtschaft e.V.
LPIS	The Land Parcel Identification System
LUCAS	Land Use/Cover Area frame Statistical Survey
MAGNET	Modular Applied GeNeral Equilibrium Tool
MMU	Minimum Mapping Unit
NDVI	Normalized Difference Vegetation Index
NIR	near infrared
NUTS	Nomenclature of Territorial Units for Statistics
SAPM	The Survey on agricultural production methods
SGDBE	Soil Geographical Database of Eurasia
SMU	Soil Mapping Units
SPAM	Spatial Production Allocation Model

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EXECUTIVE SUMMARY

This report summarises the results of a questioner sent to the partners of the mind step consortia to report on the data sources used in the project. We ask the partner to report the databases foreseen in the project. The result is listed in the tables.

These tables also include the intended use of the data sources in the different models in MIND STEP.

The summary in this deliverable is extended with respect to more detailed information to the databases and how to interface them in deliverable D2.2. Deliverable D2.4 provides prototype interfaces for some of the data sources.

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1. INTRODUCTION

In this deliverable we list the data sources used by MIND STEP partners for their models. Therefore, we prepared an Excel file in which the partners had to fill in their data sources. As this information is closely linked to WP7 “ICT platform of MIND STEP and the MIND STEP model toolbox” with D7.3 “List of data storage and processing capacities required by partners WP2-6”, we decided to build an Excel file which lists both information. For D2.1 the partners are asked to list their data sources they require for their models to properly run. Naturally those requirements are also important for their data storage and processing capacities needs. To put both information into one table gives additionally a good overview for all partners and interested persons. In this deliverable we only present the data sources, leaving the data requirements for the partners and their models for WP7. Further descriptions of the data sources and how to interface them are depicted in deliverable D2.2. Deliverable D2.4 provides the developed prototype interfaces for some data sources.

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2. SUMMARY OF REQUIRED DATA

In this chapter we present the information given by partners with regard to the data required. The partners were asked to fill in an Excel file the information for their models, for the data they use and which technical requirements they have. For this deliverable we present only the data sources which are foreseen to be used collected from each partner. In the table below the data sources are presented and the tables are divided into agricultural economic and management statistics databases, bio-physical and environmental data at high resolution and data that links these two categories. Further, information to the data sources of the established models are presented as well. The tables give information, if possible, about the name of the data source, a short description, how the access of the data is regulated, additional comments, observational unit, temporal and regional resolution. As the work in MIND STEP is highly connected between data sources and the models, we provide information about what models use which data sources.

2.1. Agricultural Economic and Management Statistics

This subchapter contains information about agricultural economic and management statistics data. Task 2.3 is involved, leader is THÜNEN.

Table 1 lists data sources of farm accountancy data. It includes FADN (Farm Accountancy Data Network) data, one from the EU and the other from different national agencies. Other farm accountancy data comes from the Brittany and Marne region in France. These data are observed at farm level. In MIND STEP we requested European FADN from DG-AGRI data as the overarching Individual decision making (IDM) model IFM-CAP also uses these data. It was delivered in April 2021.

As can be seen very clearly, seven models will use FADN data. Therefore, developing an interface for using this data is highly desirable. In deliverable D2.2 and D2.4, the prototype of the so called fadnUtils package is described and provided and first use cases are also shown.

Table 1: List of data sources of farm accountancy data

Agric. economic and management statistics (TASK 2.3) Leader: THÜNEN				
Category of data	FADN		Other Farm Accountancy Data	
Data sources in WP 3/4/5	EU Farm Accountancy Data Network (FADN)	national FADN (different countries GER, NEL, ITA)	French accounting data Brittany region	French accounting data Marne region
Short description of the data source		data provided to by national accountancy agency	data provided to INRA by an accountancy agency	data provided to INRA by an accountancy agency
open access or restricted by regulation (if regulated please add s short description under which	Regulated, application required	access strictly restricted to the national agency	access strictly restricted to INRA	access strictly restricted to INRA
Comments	No direct input of data source in models GLOBIOM, MAGNET			
Observational unit	Farm level	Farm level	Farm level	Farm level
Temporal resolution	Annually	Annually	Annually	Annually

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Regional resolution / geo reference	Down to NUTS3	Down to NUTS3	municipality	municipality
Models				
Template model (Task 3.2, WER)	x			
GHG Model (Task 3.3 WR)		x		
Crop model (Task 3.4 INRA)	x	x	x	x
Risk management model (Task 3.5 THÜNEN)	x	x		
Farm Exit Model (Task 4.2 (i) THÜNEN)		x		
AgriSpace (Task 4.2 (ii) NIBIO)				
FarmAgripolis (Task 4.3 IAMO)		x		
Supply chain Model (Task 4.4 UCSC)				
FarmDyn (Task 4.5 UBO)	x			
IFM-CAP (Task 5.2 & 5.3 JRC)	x			
GLOBIUM (Task 5.2.1 IIASA)	x			
MAGNET (Task 5.2.1 WR)	x			

Source: Own contribution with information from partners

Table 2 lists data sources of farm structure survey data. It is foreseen to use data from Germany, Norway, Netherlands and from EUROSTAT. At the end of April 2021 one of the partners started the process of requesting EUROSTAT micro data. These databases are mostly at farm level. The table also lists the source of the survey of agricultural production methods.

Farm structure survey data, being it national or European, is also used by some of the models. A prototype interface is provided in deliverable D2.2 and D2.4.

Table 2: List of data sources of farm structure survey data

Agric. economic and management statistics (TASK 2.3) Leader: THÜNEN					
Category of data	Farm Structure Survey				
Data sources in WP 3/4/5	FSS Germany	FSS Norway	FSS Netherlands	FSS from Eurostat	Survey of agric. Production methods (SAPM)
Short description of the data source	For the full population of				
open access or restricted by regulation (if regulated please add s short description under which conditions)	Regulated, application required and subject to certain conditions	no access restrictions		Restricted, application required: 1) Become research entity; 2) Request data via research proposal	
Comments	No direct input of data source in model IFM-CAP - but results				Used for validation

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Observational unit	Farm level	Farm level			
Temporal resolution	Annually for selected years	Annually		2016	
Regional resolution / geo reference	Municipality and 5x5 km	Location of the farm			
Models					
Template model (Task 3.2, WER)				x	
GHG Model (Task 3.3 WR)			x		
Crop model (Task 3.4 INRA)					
Risk management model (Task 3.5					
Farm Exit Model (Task 4.2 (i) THÜNEN)	x	x		x	
AgriSpace (Task 4.2 (ii) NIBIO)		x			
FarmAgripolis (Task 4.3 IAMO)	x				
Supply chain Model (Task 4.4 UCSC)					
FarmDyn (Task 4.5 UBO)					
IFM-CAP (Task 5.2 & 5.3 JRC)					
GLOBIUM (Task 5.2.1 IIASA)				x	
MAGNET (Task 5.2.1 WR)				x	

Source: Own contribution with information from partners

Table 3 lists data sources of miscellaneous data. First, there is a national database of economics accounts for agriculture, second data from farm management handbooks like KTBL from Germany and KWIN from the Netherlands. Last, additional data from the FLINT database is part of this table.

Table 3: List of data sources of miscellaneous data

Agric. economic and management statistics (TASK 2.3) Leader: THÜNEN				
Category of data	Economic Accounts for Agriculture	Farm Management Handbook – KTBL for Germany	Farm Management Handbook – KWIN for Netherlands	Additional Variables
Data sources in WP 3/4/5	National			FLINT
Short description of the data source	Inputs and outputs (value, quantity, unit price) at sectoral level			
open access or restricted by regulation (if regulated please add	Norway: unrestricted access	partially open	restricted	
Comments				
Observational unit	Sector level			
Temporal resolution	Annually since 1959			
Regional resolution / geo reference	National			

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Models				
Template model (Task 3.2, WER)				
GHG Model (Task 3.3 WR)			x	x
Crop model (Task 3.4 INRA)				
Risk management model (Task 3.5 THÜNEN)				x
Farm Exit Model (Task 4.2 (i) THÜNEN)				
AgriSpace (Task 4.2 (ii) NIBIO)	x			
FarmAgripolis (Task 4.3 IAMO)		x		
Supply chain Model (Task 4.4 UCSC)				
FarmDyn (Task 4.5 UBO)		x		
IFM-CAP (Task 5.2 & 5.3 JRC)				
GLOBIUM (Task 5.2.1 IIASA)				
MAGNET (Task 5.2.1 WR)				

Source: Own contribution with information from partners

Table 4 lists data sources of parcel and other data. First, there is data from the Integrated Administrative Control System (IACS) and Land Parcel Identification System (LPIS). Finally, the table includes Standard Output (SO) coefficients from the European Commission.

Table 4: List of data sources of parcel and other data

Agric. economic and management statistics (TASK 2.3) Leader: THÜNEN			
Category of data	IACS (Integrated Admin. Control System)		Other
Data sources in WP 3/4/5	Integrated Administration and Control System (IACS)	LPIS (parcel boundaries and associated crops)	SO coefficients
Short description of the data source		Parcel boundaries and associated crops per year	The standard output of an agricultural product (crop or livestock), abbreviated as SO, is the average monetary value of the agricultural output at farm-gate price, in euro per hectare or per head of livestock. There is a regional SO coefficient for each product, as an average value over a reference period (5 years, except for the SO 2004 coefficient calculated using the average of 3 years). The sum of all the SO per hectare of crop and per head of livestock in a farm is a measure of its overall economic size, expressed in euro. (https://ec.europa.eu/eurostat/web/agriculture/so-coefficients)
open access or restricted by regulation (if regulated please add s short description under which conditions)		Depends per member state	Freely available https://ec.europa.eu/eurostat/web/agriculture/so-coefficients

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Comments		Used for validation	
Observational unit	Farm/parcel	Farm/parcel	Agricultural Product
Temporal resolution	Annually	Annually	Annually for selected years
Regional resolution / geo reference	Parcel	Parcel	NUTS 2
Models			
Template model (Task 3.2, WER)			
GHG Model (Task 3.3 WR)	x	x	
Crop model (Task 3.4 INRA)			
Risk management model (Task 3.5 THÜNEN)			
Farm Exit Model (Task 4.2 (i) THÜNEN)	(x)		x
AgriSpace (Task 4.2 (ii) NIBIO)	x		
FarmAgripolis (Task 4.3 IAMO)			
Supply chain Model (Task 4.4 UCSC)			
FarmDyn (Task 4.5 UBO)			
IFM-CAP (Task 5.2 & 5.3 JRC)			
GLOBIUM (Task 5.2.1 IIASA)			
MAGNET (Task 5.2.1 WR)			

Source: Own contribution with information from partners

2.2. Bio-physical and Environmental Impact Relevant Data at High Resolution

This subchapter contains information about bio-physical and environmental impact relevant data at high resolution. Task 2.4 is involved, leader is WR.

Table 5 lists data sources of geo referenced data (I). These are satellite data, elevation data on altitude and slope and finally climate data.

Table 5: List of data sources of geo referenced data (I)

Bio-physical and environmental impact relevant data at high resolution (Task 2.4) Leader: WR			
Category of data	Geo referenced data (I)		
Data sources in WP 3/4/5	satellite data (indices of vegetation or greenness)	Elevation data on slope, altitude	Climatic data
Short description of the data source	Many indices can be derived from satellite, but probably indices of greenness (NDVI, …) are most available		Historic and future weather and climate patterns

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open access or restricted by regulation (if regulated please add s short description under which conditions)	Some EU wide solutions are available, with varying quality. Some national systems available	open data	Open data, although finer resolutions are often not available
Comments			
Observational unit	Grid	Grid	Grid
Temporal resolution	Inter-annually	Annually	
Regional resolution / geo reference	Grid	Grid	Grid
Models			
Template model (Task 3.2, WER)			
GHG Model (Task 3.3 WR)	x	x	x
Crop model (Task 3.4 INRA)			x
Risk management model (Task 3.5 THÜNEN)		x	x
Farm Exit Model (Task 4.2 (i) THÜNEN)		x	x
AgriSpace (Task 4.2 (ii) NIBIO)			
FarmAgripolis (Task 4.3 IAMO)			
Supply chain Model (Task 4.4 UCSC)			
FarmDyn (Task 4.5 UBO)			
IFM-CAP (Task 5.2 & 5.3 JRC)			
GLOBIUM (Task 5.2.1 IIASA)			
MAGNET (Task 5.2.1 WR)			

Source: Own contribution with information from partners

Table 6 lists data sources of geo referenced data (II). These are soil data, land cover and land use, landscape (LUCAS) data as well as CORINE Land Cover (CLC) (Coordination of Information on the Environment Land Cover) data.

Table 6: List of data sources of geo referenced data (II)

Bio-physical and environmental impact relevant data at high resolution (Task 2.4) Leader: WR			
Category of data	Geo referenced data (II)		
Data sources in WP 3/4/5	soil data	LUCAS	CORINE Land Cover
Short description of the data source	European Soil Database, most likely or national soil data bases	LUCAS is on different classes of land use (urban, nature, etc).	The CORINE Land Cover (CLC) inventory was initiated in 1985 (reference year 1990) to standardize data collection on land in Europe to support environmental policy development. Updates were produced in 2000, 2006, 2012 and 2018. Change layers were produced for 2000, 2006, 2012 and 2018.
open access or restricted by regulation (if regulated please add s short description under which conditions)	open data	open data	Freely available - EIONET account needed. https://www.eea.europa.eu/data-and-maps/data/copernicus-land-monitoring-service-corine
Comments		Used for validation	

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Observational unit			Area land cover
Temporal resolution			1990, 2000, 2006, 2012, 2018
Regional resolution / geo reference			Minimum Mapping Unit (MMU): 25 ha
Models			
Template model (Task 3.2, WER)			
GHG Model (Task 3.3 WR)	X		
Crop model (Task 3.4 INRA)	X		
Risk management model (Task 3.5 THÜNEN)	x		
Farm Exit Model (Task 4.2 (i) THÜNEN)			X
AgriSpace (Task 4.2 (ii) NIBIO)			
FarmAgripolis (Task 4.3 IAMO)			
Supply chain Model (Task 4.4 UCSC)			
FarmDyn (Task 4.5 UBO)			
IFM-CAP (Task 5.2 & 5.3 JRC)			
GLOBIUM (Task 5.2.1 IIASA)			
MAGNET (Task 5.2.1 WR)			

Source: Own contribution with information from partners

2.3. Link Between Economic and Bio-physical Databases

This subchapter contains information about the link between economic and bio-physical databases. Task 2.5 is involved, leader is JRC.

Table 7 lists the CAPDIS (CAPRI data spatially disaggregated) database.

Table 7: Link Between Economic and Bio-physical Databases

Link Between Economic and Bio-physical Databases (Task 2.5) Leader: JRC	
Category of data	Link Between Economic and Bio-physical Databases
Data sources in WP 3/4/5	CAPDIS
Short description of the data source	main source: CAPRI regional data. Additional sources: FSS, Corine, PESETA crop yields, irrigation map
open access or restricted by regulation (if regulated please add s short description under which conditions)	no access restrictions; available on request
Comments	
Observational unit	
Temporal resolution	Annual, currently available 2000, 2002, 2004, 2006, 2008, 2010, 2012
Regional resolution / geo reference	Spatial unit (FSU) = overlay of administrative regions (NUTS2), 10 x 10 km2 INSPIRE grid, Soil Mapping Units
Models	

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Template model (Task 3.2, WER)	
GHG Model (Task 3.3 WR)	
Crop model (Task 3.4 INRA)	
Risk management model (Task 3.5 THÜNEN)	
Farm Exit Model (Task 4.2 (i) THÜNEN)	(x)
AgriSpace (Task 4.2 (ii) NIBIO)	
FarmAgripolis (Task 4.3 IAMO)	
Supply chain Model (Task 4.4 UCSC)	
FarmDyn (Task 4.5 UBO)	
IFM-CAP (Task 5.2 & 5.3 JRC)	
GLOBIUM (Task 5.2.1 IIASA)	
MAGNET (Task 5.2.1 WR)	

Source: Own contribution with information from partners

2.4. Data sources of established models

This subchapter contains information data sources of established models. Task 2.6 is involved, leader is IIASA.

Table 8 lists the established models and their databases.

Table 8: List of data sources of established models

Established models (Task) 2.6 Leader: IIASA				
Category of data	Established model			
Data sources in WP 3/4/5	CAPRI	GLOBIOM	MAGNET	IFM-CAP
Short description of the data source				
open access or restricted by regulation (if regulated please add s short description under which conditions)				
Comments				
Observational unit	Nuts2	Grid	Country	farm level
Temporal resolution	annual	annual	annual	annual
Regional resolution / geo reference	Nuts2	Grid	Country	farm level
Models				
Template model (Task 3.2, WER)				x
GHG Model (Task 3.3 WR)				
Crop model (Task 3.4 INRA)				
Risk management model (Task 3.5 THÜNEN)				
Farm Exit Model (Task 4.2 (i) THÜNEN)				x
AgriSpace (Task 4.2 (ii) NIBIO)				
FarmAgripolis (Task 4.3 IAMO)				

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Supply chain Model (Task 4.4 UCSC)	x	x	x	
FarmDyn (Task 4.5 UBO)				
IFM-CAP (Task 5.2 & 5.3 JRC)				
GLOBIUM (Task 5.2.1 IIASA)				
MAGNET (Task 5.2.1 WR)				

Source: Own contribution with information from partners

3. CONCLUSION

From the information given and the discussions during the kick-off meeting almost all partners use many different data sources. Some of the databases are used by several partners and some databases are connected with other databases used in MIND STEP. Some databases are restricted accessible and cannot be connected with other databases. In MIND STEP we requested European FADN Data and it was delivered in April 2021. At the end of April 2021, we started the process of requesting EUROSTAT micro data.

In deliverable D2.2 there is more information regarding the data sources used in MIND STEP and how they can be interfaced bye the user. In deliverable D2.4, first prototypes of interfaces of some of the data sources are developed.

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ANNEX I MIND STEP WP2 TEAM

Mr Alexander Gocht (THÜNEN)

Mr Sebastian Neuenfeldt (THÜNEN)

Ms Xinxin Yang (THÜNEN)

Mr Hugo Storm (UBO)

Mr John Helming (WR)

Mr Marc Müller (WR)

Mr Sander Jannsen (WR)

Mr Gerbert Roerink (WR)

Mr Albert Brouwer (IIASA)

Dimitrios Kremmydas (JRC)

CONSORTIUM DESCRIPTION

The consortium of MIND STEP consists of 11 partners from 7 countries in Europe (the Netherlands, Germany, Austria (IIASA), Italy, France, Spain (JRC-Seville), Norway and Hungary). It includes partners from the private and public sector representing:

- Academia and higher education (UBO, UCSC, WU).
- SME dealing with research consultancy, data collection, strategic advice, normalization and policy in the field of energy, environment and sustainable development. This SME has also a strong track record in the field of communication, stakeholder engagement and exploitation (GEO)
- Public government bodies dealing with agricultural and environmental research and data collection and building agricultural models at different scales (WR, IIASA, IAMO, THÜNEN, INRA, NIBIO, JRC)

The consortium has been carefully constructed in such a way that it is capable of jointly managing all activities and risks involved in all project stages. Each partner contributes its own particular skills, (inter) nationally wide network and expertise, and has a critical role in MIND STEP. Partner expertise smoothly complements each other and all together form the full set of capabilities necessary to lead MIND STEP to a success. Achieving the overall objective is determined by all partners in the consortium as well as their ability to involve other interested stakeholders in the process of developing, validating and disseminating the IDM models, indicators and methodologies (WR, UBO, IAMO, UCSC, WU, THÜNEN and INRA) and linking IDM models to current agricultural policy models (WR, IIASA, UBO) included in the MIND STEP model toolbox. Dissemination and communication activities are steered by partner GEO who has graphic design, IT and marketing communication teams to deliver out-of-the-box and novel solutions for dissemination and communication and JRC who has a large network with policy makers. GEO has experience in leading comparable activities in H2020 projects as UNISECO and COASTAL. The coordinator WEcR is part of Stichting Wageningen Research (Wageningen Research Foundation, WR). WR consists of a number of specialised institutes for applied research in the domain of healthy food and living environment. WR collaborates with Wageningen University (WU) under the external brand name Wageningen University & Research. One of the strengths of Wageningen University & Research (including WR) is that its structure facilitates and encourages close cooperation between different disciplines. The institutes Wageningen Economic Research (proposed coordinator of MIND STEP, WEcR) and Wageningen Environmental Research (WEnR) are involved in this proposal. The One-Wageningen approach will also be applied to MIND STEP. WEcR has a long-standing

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reputation of leading large-scale EU projects, such as SUPREMA, Foodsecure, SUSFANS, FLINT, SAT-BBE, and SIM4NEXUS.

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