

FAIRagro Task Areas and their collaboration with Use Case 3

Senthold Asseng (Technical University of Munich, TUM) 

Til Feike (Julius Kühn-Institute, JKI) 

Ulrike Stahl (Julius Kühn-Institute, JKI) 

Daniel Martini (Kuratorium für Technik und Bauwesen in der Landwirtschaft, KTBL) 

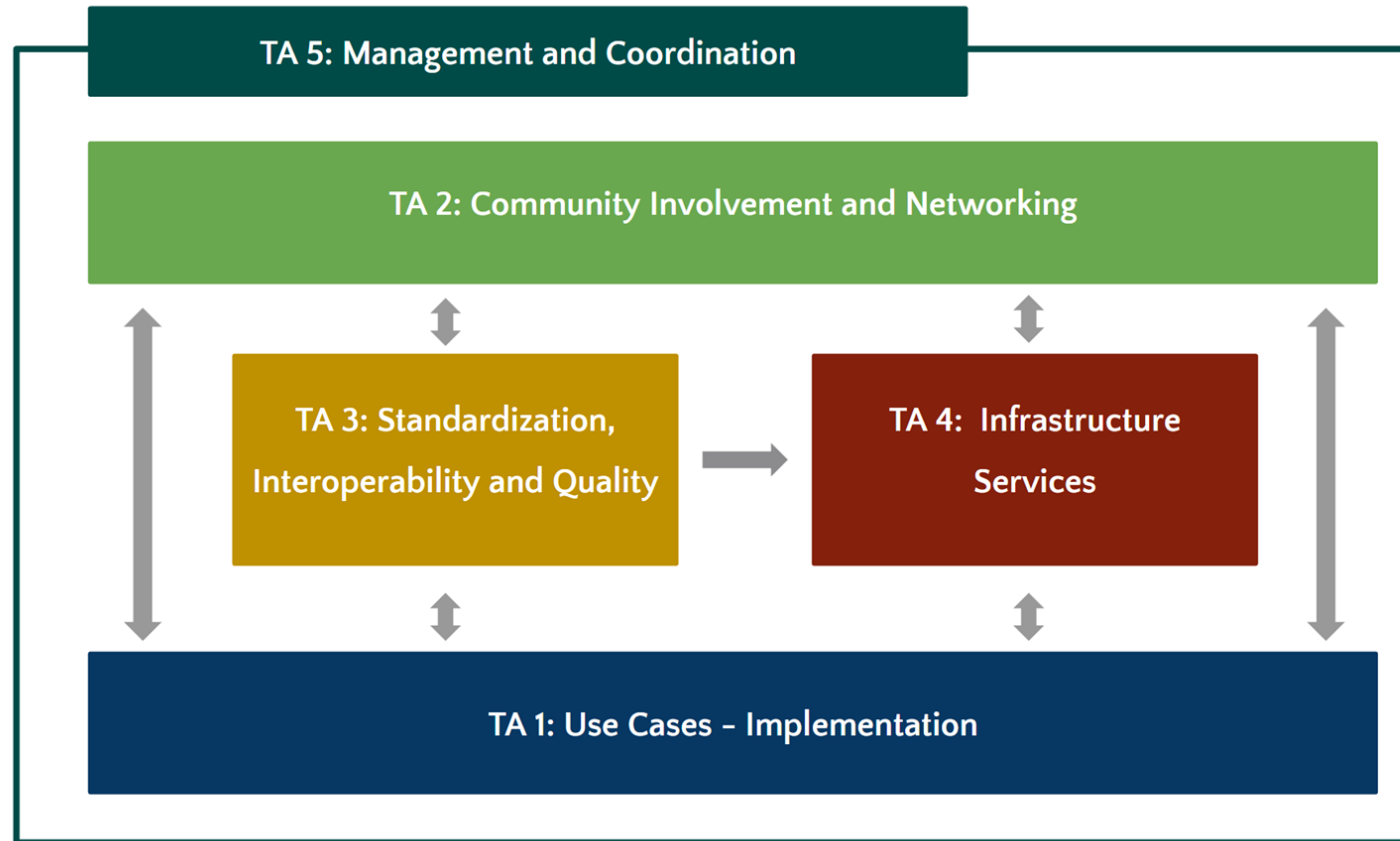
Matthias Lange (Leibniz Institute of Plant Genetics and Crop Plant Research, IPK) 

Daniel Arend (Leibniz Institute of Plant Genetics and Crop Plant Research, IPK) 

Xenia Specka (Leibniz Centre for Agricultural Landscape Research, ZALF) 

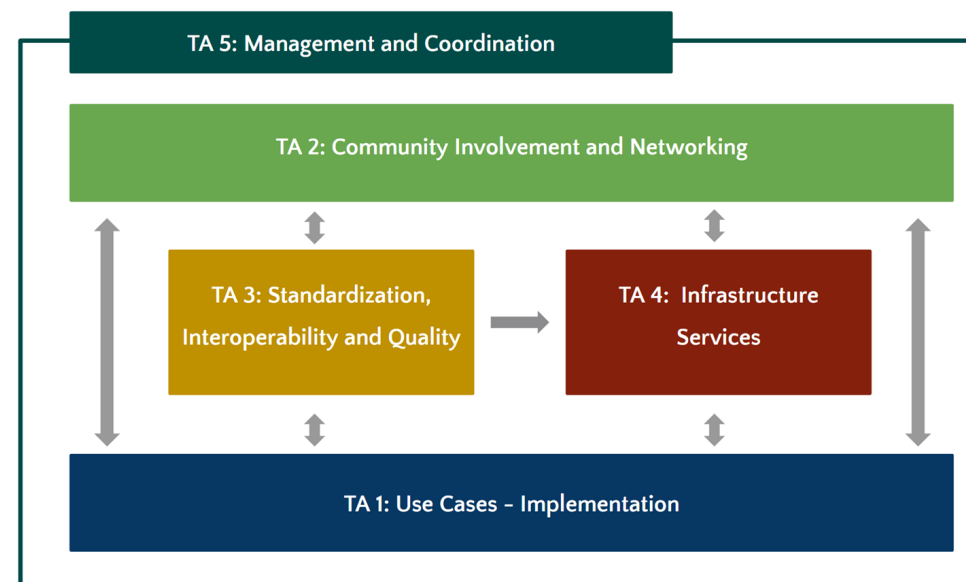
on behalf of the FAIRagro consortium

How do the task areas work together?



Task Area 1: Use Cases – Implementation & Introduction of use case 3

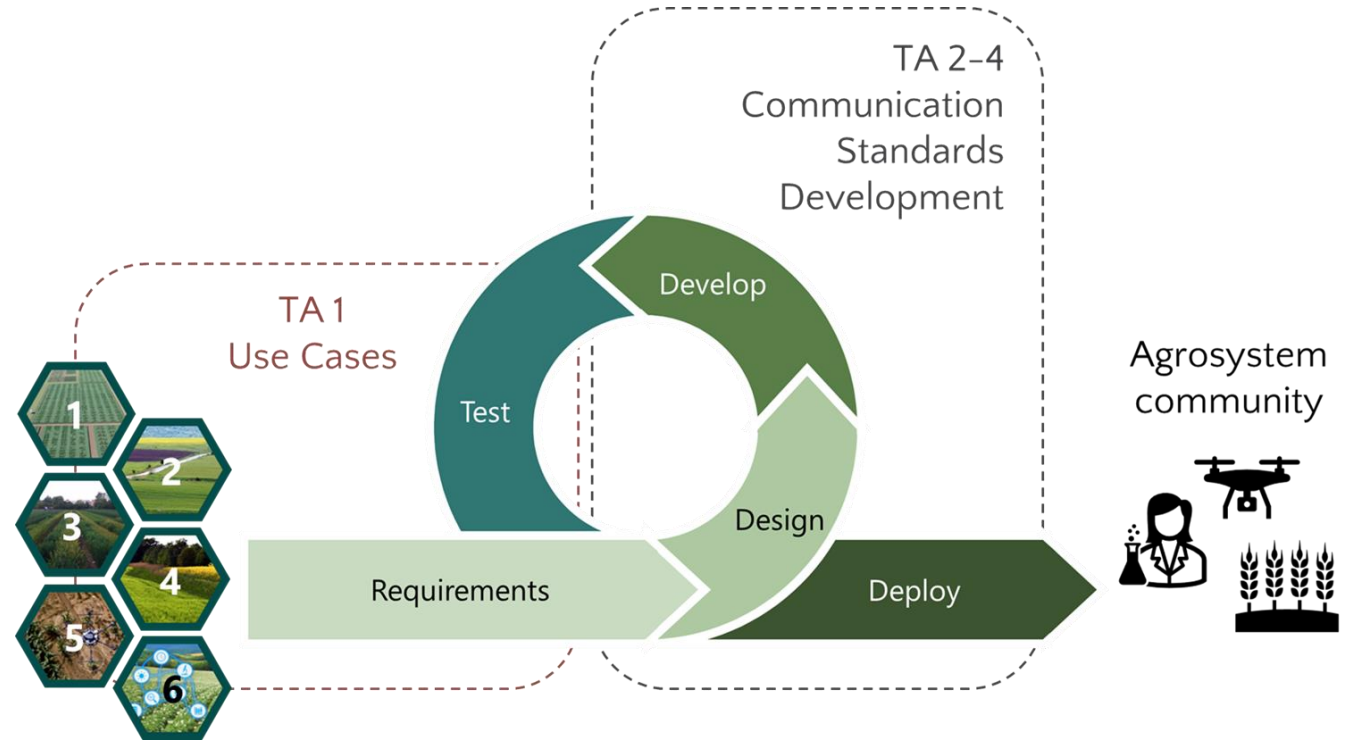
Senthoid Asseng (TUM), Til Feike (JKI)



Task Area 1: Use Cases - Implementation

Objectives

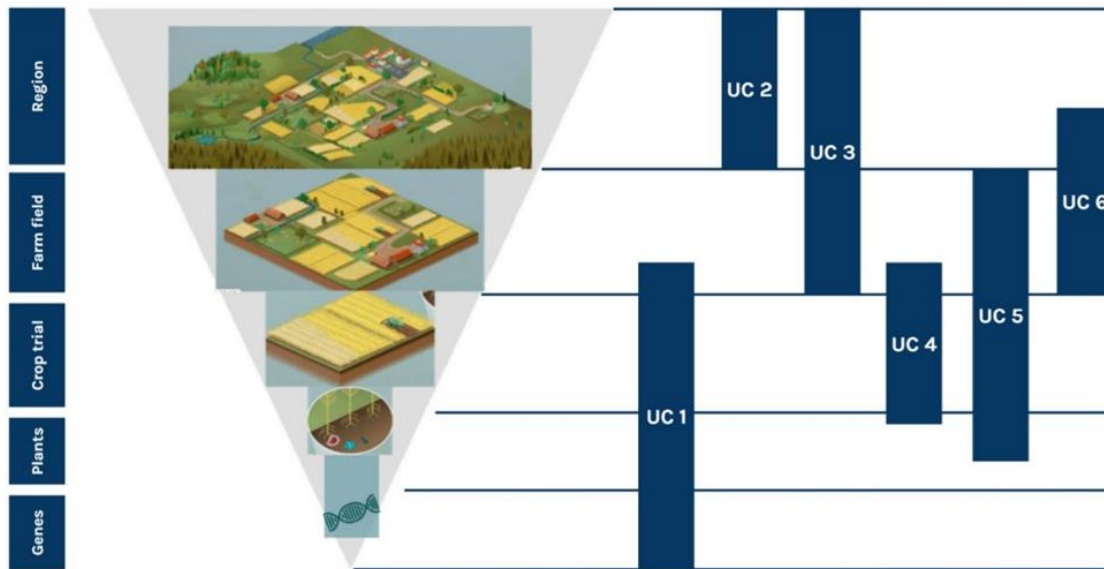
- Identify data management challenges in a variety of agrosystem research applications (use cases)
- Use these as a basis for the development of concepts and services for FAIR-compliant data infrastructures
- Adopt an iterative development approach



Task Area 1: Use Cases - Implementation

Coverage

- UCs covers a cross-scale spectrum of agrosystem research
- Challenges generalizable to a wide range of agrosystem research applications



Measures

- Measure 1.1: UC1 - Exploiting genotype \times location \times year \times management interactions for sustainable crop production | *IPK, UHOH*
- Measure 1.2: UC2 - Assessing tradeoffs for optimal crop nitrogen management | *ZALF, Thünen, UFZ, DWD, GAUG*
- Measure 1.3: UC3 - Streamlining pest and disease data to advance integrated pest management | *JKI, ZEPP, ISIP*
- Measure 1.4: UC4 - Learning from incomplete data | *ZALF, ZB MED, Uni Bonn, TUM*
- Measure 1.5: UC5 - Non-invasive phenotyping with autonomous robots | *FZJ, Uni Bonn*
- Measure 1.6: UC6 - Automated data flows for crop simulation models | *TUM, LfL, HSWT, BSA, ATB*

Task Area 1: Use Cases - Implementation

Activities, milestones and events in 2023

- Across TA1
 - Inventory of data-related assets and needs
 - Identification of synergies between UCs
 - Networking with other TAs to implement feedback loops for the definition of inventory items
- UC milestones
 - UC3: Workshop with IPM data stakeholders to define guidelines for data harmonization and standardization
 - UC6: Workflow for crop model applications as digital objects SciWIn
 - First milestones for UCs 1 and 5 to be reached by Q1 2024

	2023				2024
	Q1	Q2	Q3	Q4	Q1
UC1					M1.1.1
UC2					
UC3				M1.3.1	
UC4					
UC5					M1.5.1
UC6				M1.6.1	

Use Case 3: “Streamlining pest and disease data to advance integrated pest management”

(Til Feike, JKI)

Use Case 3: “Streamlining pest and disease data to advance integrated pest management”

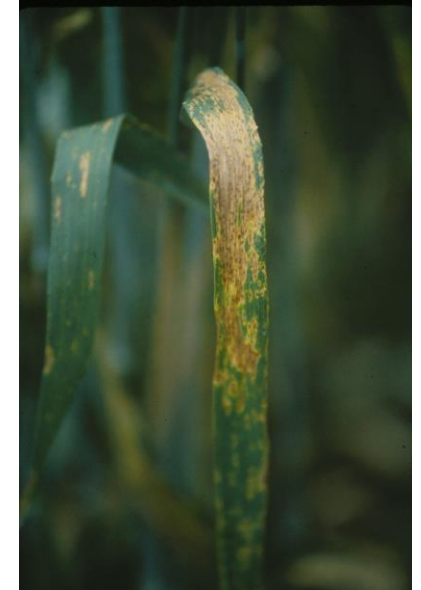


Scientific background

- **Reduction of pesticide** use by 50% until 2030
- Nevertheless, **avoid yield losses** to pests & diseases (P&D)
- Effective implementation of **integrated pest management (IPM)** crucial
- **Improve** data infrastructure & **RDM on IPM** to foster R&D and development of DSS for improved IPM in agrosystems



Foto: pxhere.com



Fotos: CIMMYT

Use Case 3: “Streamlining pest and disease data to advance integrated pest management”



RDM Challenges

1. **Heterogenous data** base: Differences in experiment designs and P&D abundance and damage assessments
2. **Missing overview** on existing experimental data on P&D and respective yield losses
3. **Lack of integrated decisions support systems** considering yield losses and environmental risk

Use Case objectives

- Improve the **standardisation**, **findability** and **applicability** of P&D and yield loss data
- Develop a **blueprint for IPM DSS**; Integration P&D, yield losses & environmental risk

Use Case 3: “Streamlining pest and disease data to advance integrated pest management”

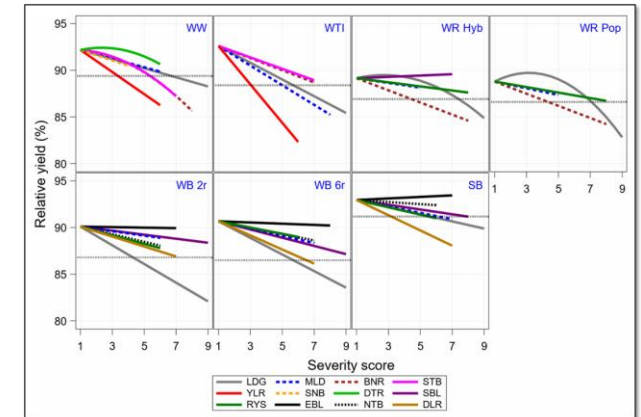


FAIRagro

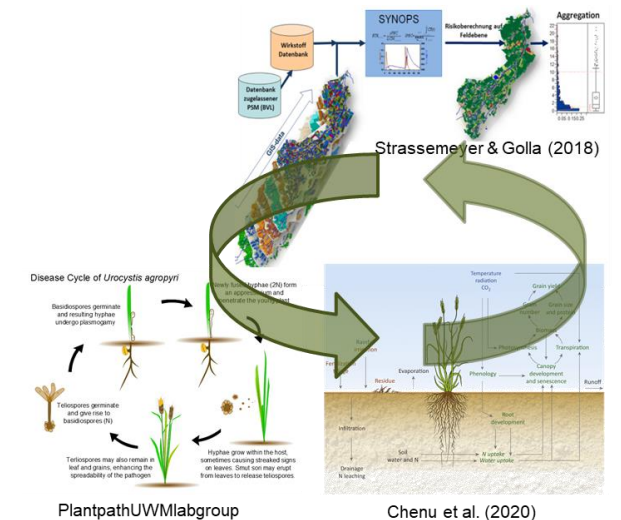
Objectives and expected outcomes

Objective “Improve the standardisation, findability and applicability of P&D and yield loss data”

- Develop **guidelines** for yield loss trials
- Develop **inventory** on P&D and yield loss data
- Develop **blueprint** for improved IPM-Decision support systems (DSS), considering occurrence and development of P&D, crop damage and yield effects, as well as environmental risk



Laidig, F., Feike, T., Klocke, B. et al. (2022) *Euphytica*



Strassmeier & Golla (2018)

PlantpathUWMLabgroup

Chenu et al. (2020)

Use Case 3: “Streamlining pest and disease data to advance integrated pest management”

Use Case summary

- Minimize negative impacts of **50% pesticide reduction** and productivity of agrosystems
- **Effective IPM**
- **Improve RDM** on P&D and yield losses
 - **Standardisation**
 - **Findability**
 - **Applicability**

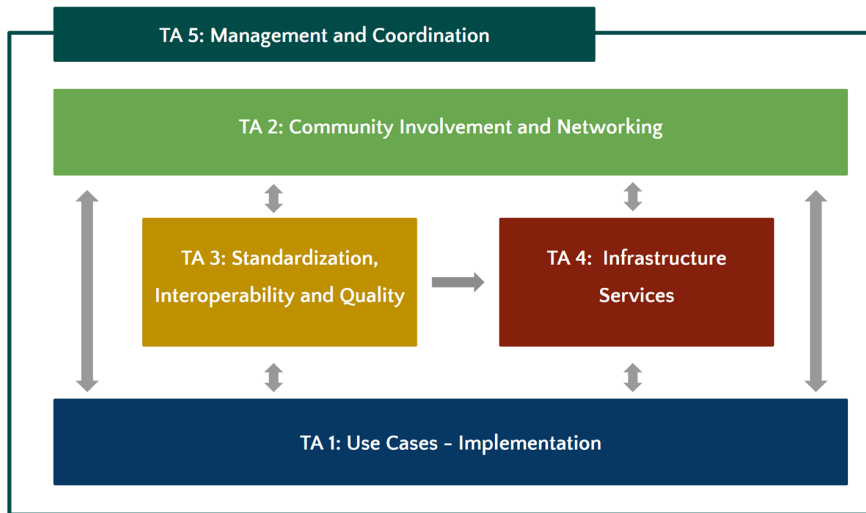
Partners:



Use Case duration: 2023-2027

Task Area 2: Community Involvement and Networking

Ulrike Stahl (JKI)



Task Area 2: Community Involvement and Networking

Objectives



to gather the community by focusing on **communication, networking** and **information** activities



to engage the community in FAIRagro developments by focusing on **direct** and **indirect participation**



to train the community by focusing on **courses**, provision of **training material**, and by contributing to **education**



to support the community in research data management focusing on **direct contact** and **first** and **second level support**

Measures

- Measure 2.1: Communication and Dissemination | *JKI*
- Measure 2.2 Participation and 2.3 Onboarding | *ATB*
- Measure 2.4 Training and Education | *ZBMED*
- Measure 2.5 Data Steward Service Center (DSSC) | *ZALF, FIZ, IPK, JKI, Uni Bonn*

Activities, milestones and events in 2023/2024:



- **FAIRagro Portal concept** (fundamental design, structure and functions) developed
- Dissemination of actual FAIRagro information via already established online channels (e.g., **Website**)
- networking and **communication at scientific conferences** (e.g. CoRDI (NFDI), DPG-Pflanzenschutztagung)
- concept of a **Customer Relationship Management (CRM)**



- concept to establish the **Community Advisory Board (CAB)**
- concept for **Use Case Onboarding process**



- **Training and dissemination** concept



- **kickoff meeting of Data Stewards** at DSSC; establishment of meeting, working, information procedures
- concept for Helpdesk and second level support

Support and activities of TA 2 for UC 3



- **advertising planned UC3 workshops** via the Website and Multimedia Channels
- looking for relevant stakeholders and data holders in the field of P&D data **supporting UC3 workshops**
- support the **dissemination of e.g. guidelines and where to find relevant P&D data** at the FAIRagro portal



- collecting **needs and feedback** after the workshops
- monitor and **evaluate UC 3 implementation** to develop the criteria catalog for the onboarding concept



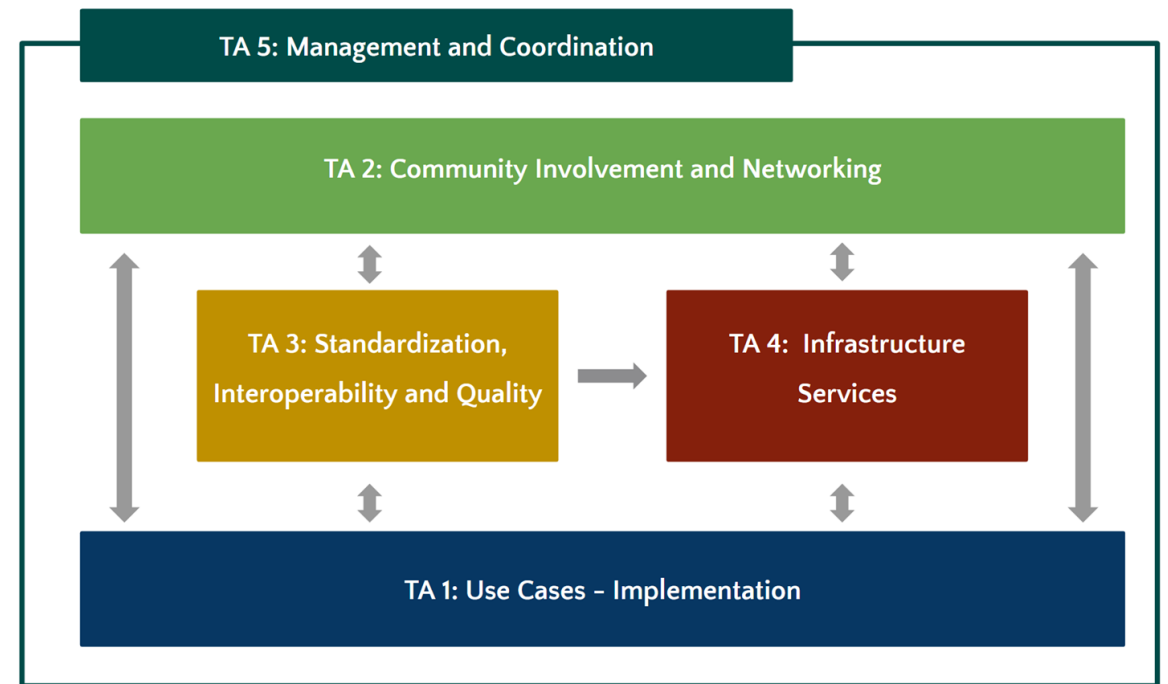
- **offer training** with respect to data documentation and publishing for researchers connected to UC3
- taking on the **results of UC3 to the training content**, e.g. guidelines for yield loss trials as a topic



- **support by Datastewards** with legal expertise and FAIR data provision of out of the DSSC in a “booking on demand” manner to guarantee help at data curation and publishing
- **collect FAQs** with respect to Research Data Management to provide 1st level Support via the FAIRagro Portal
- provide **2nd Level Support via the Helpdesk** as feature of the FAIRagro Portal

Task Area 3: Standardization, Interoperability and Quality

Daniel Martini (KTBL)



Task Area 3: Standardization, Interoperability and Quality

Objectives

- **facilitate:**
 - reuse
 - quality screening
 - annotation
- **provide information and guidance on:**
 - standards and best practices
 - vocabularies and ontologies
 - data quality and legal issues
- **adapt and extend:**
 - existing specification
 - templates
- **develop and provide:**
 - metadata profiles
 - mappings and alignments
 - mechanisms for quality and handling of legal issues

Measures

- Measure 3.1: Standards for Digital Resources | *KTBL, JKI, ZBMED*
- Measure 3.2: Standards for Data Management, FAIRness and Discoverability | *ZBMED, KTBL, SGN, IPK*
- Measure 3.3: Measures and Application-data-matrix for Data Quality and Fitness-for-use | *JKI, ZALF*
- Measure 3.4: Data Quality Annotation, Curation and Feedback/Review | *UBN, FZJ*
- Measure 3.5: FAIR Workflows and FAIR Digital Objects | *SGN, JKI, KTBL*
- Measure 3.6: Legal Framework and Machine-Actionable Policies | *FIZ, SGN, KTBL*

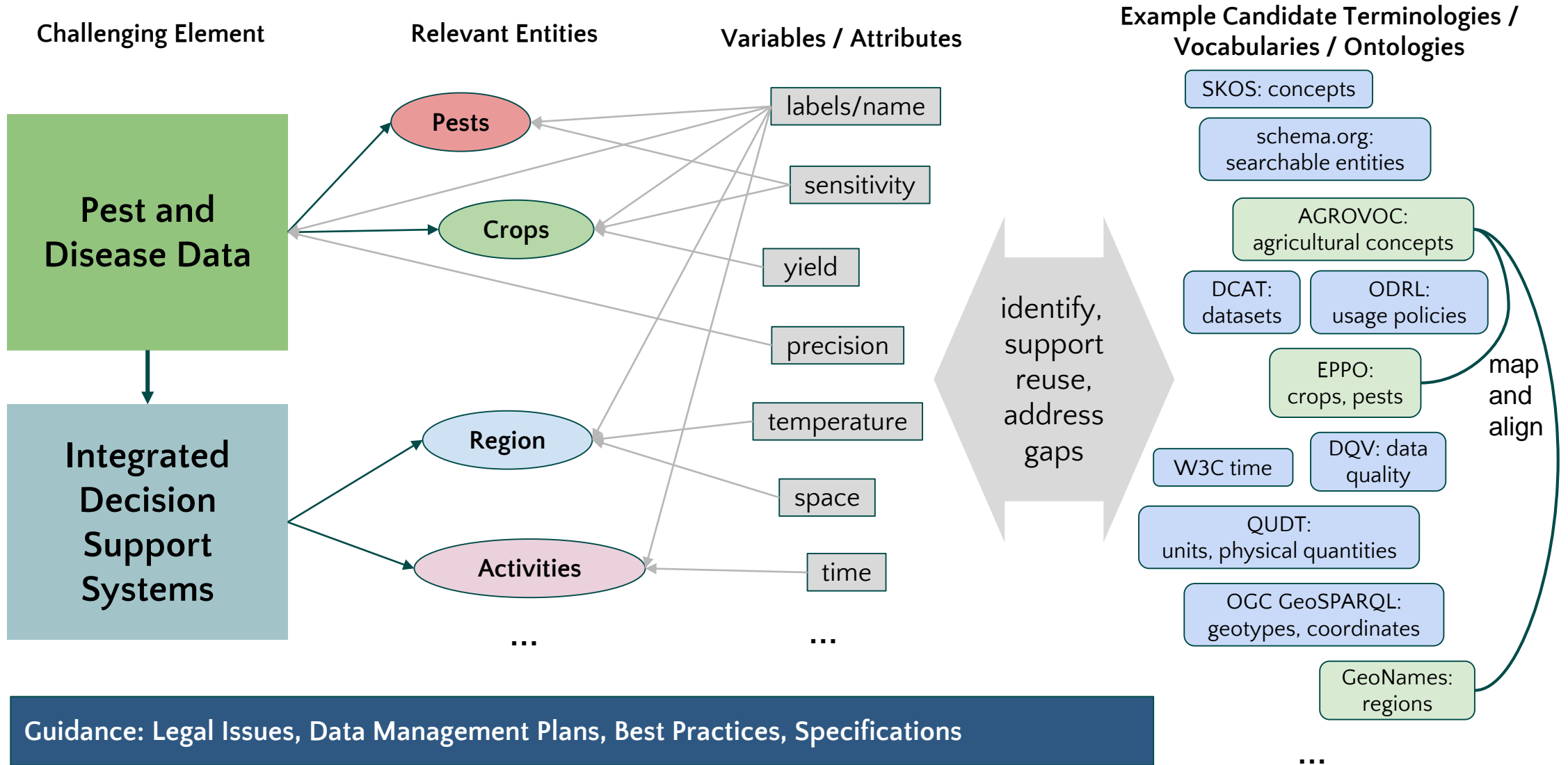
Activities, milestones and events in 2023

- Creating the inventory of relevant standards, ontologies and vocabularies (M3.1.1)
- Organization of an AgriHackathon on schema.org extension (M3.2.2)
- Community workshops to identify users' application specific, relevant agrosystem data quality needs (M3.3.1)
- Data quality workshop with experts in mobile sensing, machine learning and plant phenotyping (D3.4.1)
- FAIR digital object service ecosystem: conceptual specification for protocol and API (M3.5.2)
- Assessment of Legal Status Quo, community feedback workshop (M3.6.1, M3.6.2)
- Data clustering according to legal categories (D3.6.2)

Summarized:

Material and information collection / assessment, requirements gathering and feedback involving users

Support and activities of TA 3 for UC 3



1. Collecting information from the use case:

- a. What pest and disease **data** is provided already and relevant for the use case and what **metadata** is available so far for these data?
- b. Which **data types** are currently collected and how are they described (variable catalogs)?
- c. Which existing **ontologies/terminologies/coding systems** exist that could be used as base for semantic concepts
- d. Which existing and additional user's application-specific **data quality information** is needed?

2. Alignment with existing terminologies

- a. Which terminologies can we **recommend**
- b. Are they approximately complete or do we need to **extend** them?
- c. Can we **suggest mappings** to common semantic artifacts?

3. Elaboration of metadata for a standardized publication of these data

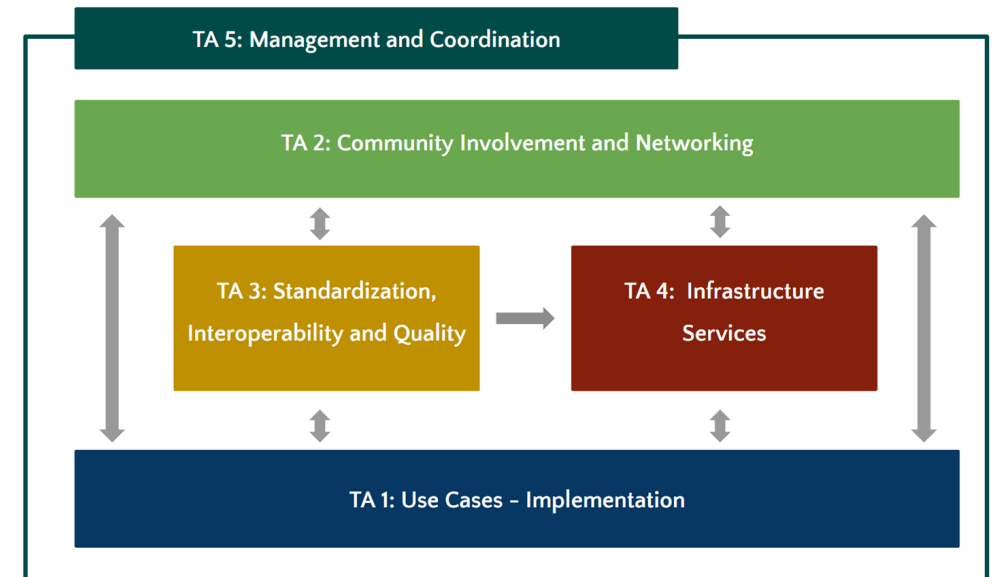
- a. **generic metadata** fitting for all use cases
- b. additional **specific metadata** necessary for the description of disease and pest data

4. Support in the harmonization and reusability of data sets

- a. Can we **increase** the **FAIRness** of the UC's resources?
- b. **formalize** UC's data **quality needs** to determine fitness-for-use within it
- c. Support **clarification of legal issues**

Task Area 4: Infrastructure Services


Matthias Lange (IPK)



Objectives

- FAIRagro portal
- technical operation of the central FAIRagro services
- FAIR enabled research data lifecycle
- federated service infrastructure
- bridge to NFDI's cross-cutting infrastructure services
- re-usable data integration workflows

Measures

-  ● 4.1: Central Services for the FAIRagro Community
ZALF (lead), JKI
-  ● 4.2: Network of federated research data infrastructures
IPK (lead), ZALF, SGN, JKI, Thünen, ZB MED, UBN, TUM, FZJ, DWD
-  ● 4.3: Searchable Inventory of Services and Data
ZBMED (lead), FZJ, UBN
-  ● 4.4: Scientific Workflow Infrastructure (SciWIn)
Thünen (lead), IPK, BLU

Icons made by Eucalip from www.flaticon.com

Task Area 3: Infrastructure Services

Activities, milestones in 2023: Measure 4.1

Action	No.	Description	Due end of
1	M4.1.1	Technical Requirements of the FAIRagro Portal	Q2 2023
	M4.1.2	Evaluation and Selection of software solutions for the FAIRagro Portal	Q4 2023
	D 4.1.1	Implementation Strategy for the FAIRagro Portal	Q4 2023
2	M 4.1.4	Evaluation and selection of project management systems	Q4 2023
	D 4.1.2	Project management platform operational	Q4 2023
3	M 4.1.5	Ticket system and CRM operational	Q3 2023
	D 4.1.6	Documentation and manuals for the use of the helpdesk	Q4 2023
4	D4.1.7	RDMO instance operational	Q3 2023

UC3 – Requirements & Tasks for TA4

1. Utilisation of the Search & Inventory Services (**Measure 4.3**) of the FAIRagro Portal

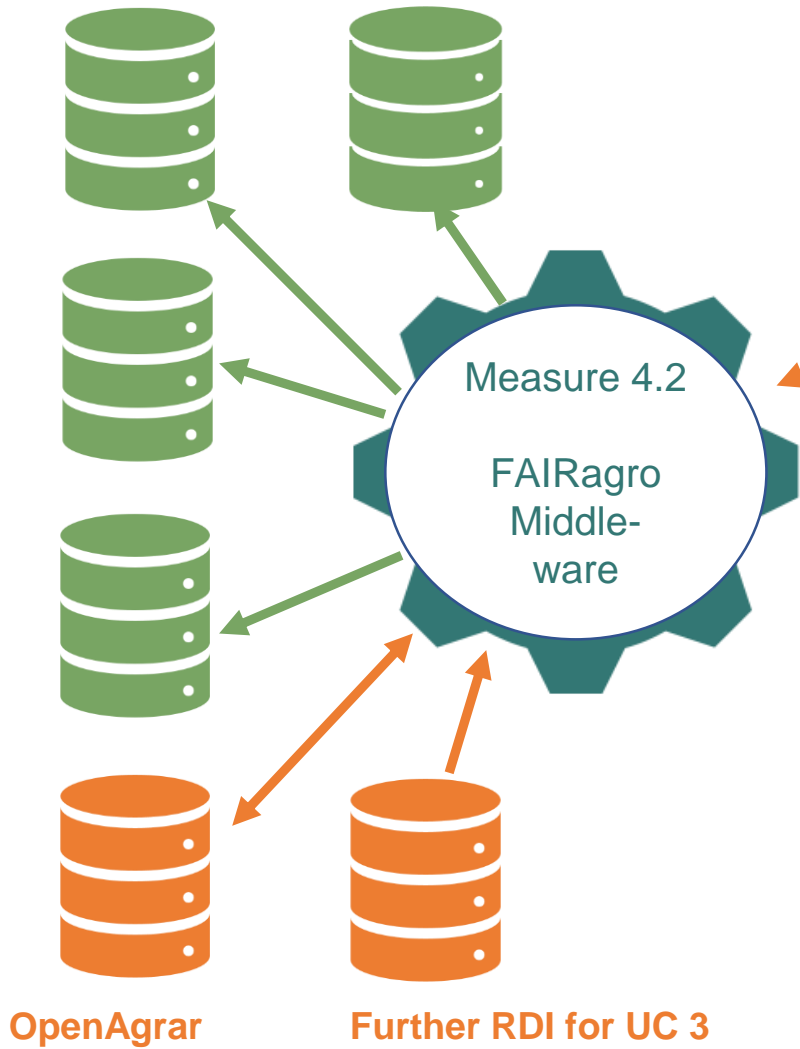


- Overview and access to relevant P&D and yield loss data
- Compile a pool of relevant IPM data
- **UC3 Action 2:** Provide the metadata on datasets via OpenAgrar and FAIRagro Portal

2. Access to FAIRagro RDIs (Research Data Infrastructures) e.g. OpenAgrar



- Connecting to FAIRagro middleware (**Measure 4.2**)
- Consider semantic metadata to find useful datasets
- **UC3 Action 3:** Develop integrative P&D models using the improved & linked data infrastructures



Measure 4.3



Inventory of RDIs & Services

Integrated Pest and Disease Data

- Search and provide metadata on relevant P&D datasets and yield loss data (UC3 Action 2)
- Provide developed, integrated P&D models and data sets (UC3 Action 3)

Search



- Metadata based
- Field trial information, genotypic or phenotypic features or disease information
- Integrate weather data, soil information as filter options in an advanced version

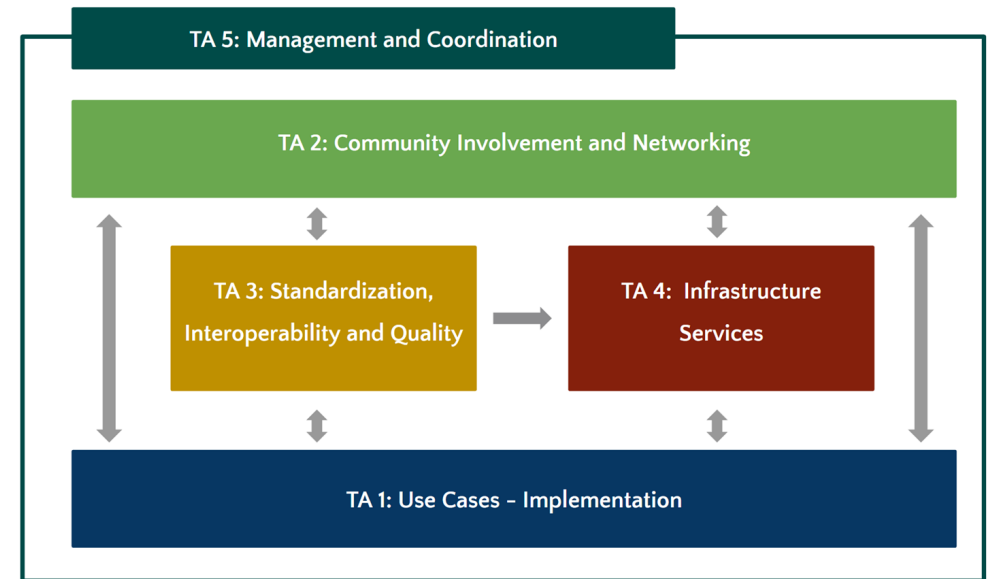


RDI Inventory (interaction TA3)

- Qualitative and quantitative indicators
- User feedback on data quality and missing data
- Features data curation by data curators (Community crowd sourcing)

Task Area 5: Management & Coordination

Xenia Specka (ZALF)



Task Area 5: Management and Coordination



FAIRagro

Objectives

- Coordination and management of FAIRagro; financial management
- Development of FAIRagro in a sustainable, long-lasting institution
- Networking between NFDI and international RDM initiatives

Measures

- Measure 5.1: Project Management, Governance and Financial Controlling | [ZALF](#)
- Measure 5.2: Sustainability and Business Model | [ZALF](#)
- Measure 5.3: Cross-NFDI and international networking | [ZALF](#)

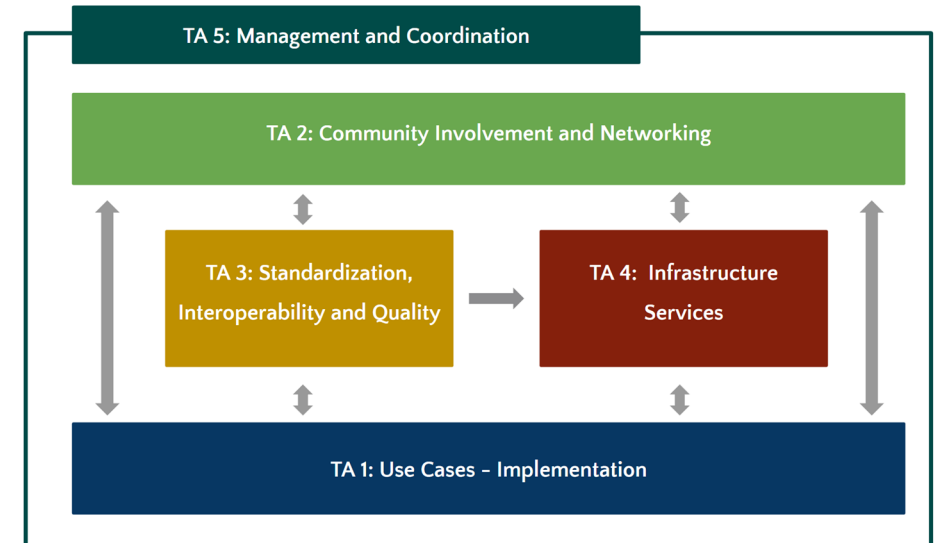
Support and activities of TA 5 for UC 3

General support

- Communication (Email distribution lists)
- Provide information about consortium activities and contact persons

Networking

- Initiate contact within FAIRagro and with other NFDI consortial
- Initiate contacts between national and international initiatives



Contact: fairagro@zalf.de

