

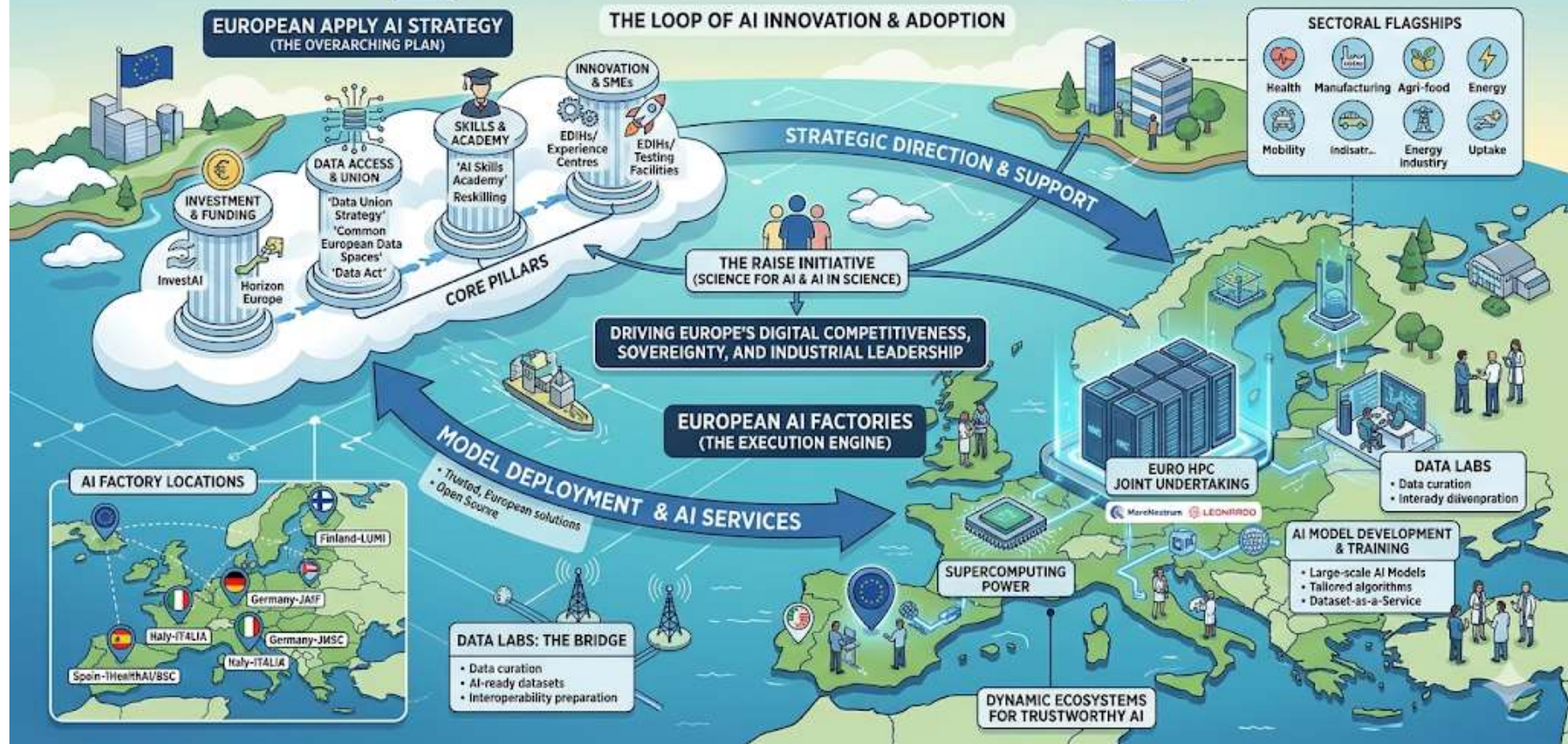


Toxic Plant Detection by Image Processing & AI

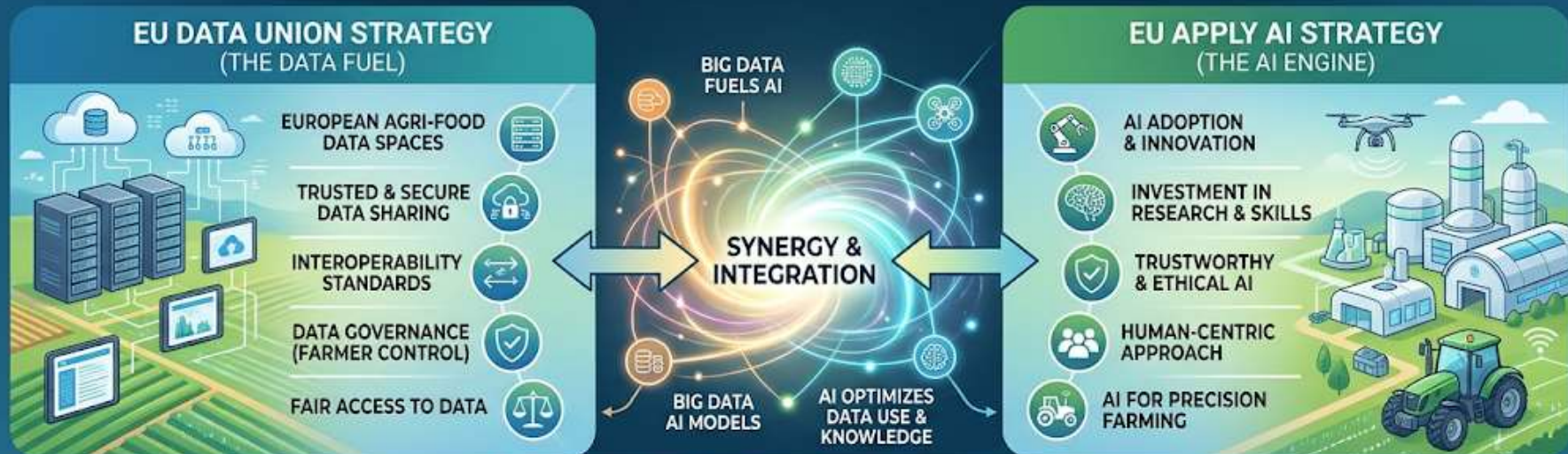
- **Digital Europe Strategy**
- **Agrifood**
- **Data Spaces-CEADS**
- **Horizon/Agdata Funded Call**
- **Consortium: Toxic Plant Detection**

FSNext-SAM (Smart Agricultural Management)

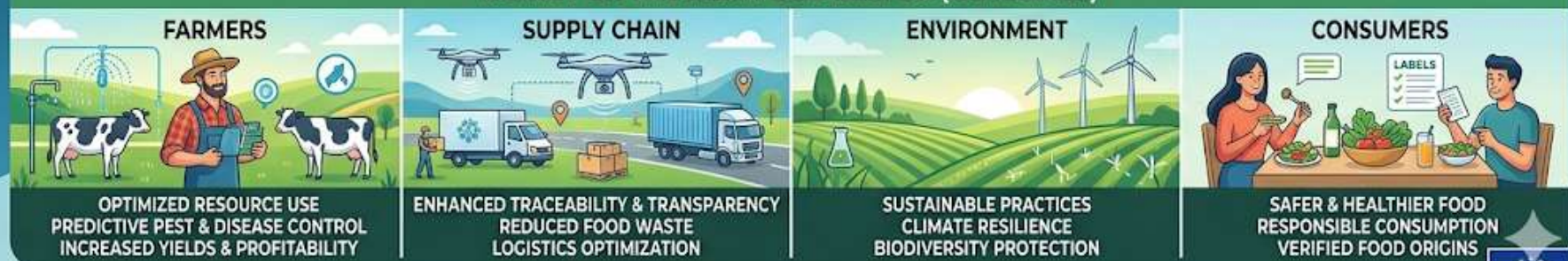
EUROPEAN APPLY AI STRATEGY & AI FACTORIES: A SYNERGISTIC LANDSCAPE



INTERACTION & RELATIONSHIP: EU APPLY AI STRATEGY + EU DATA UNION STRATEGY IN THE AGRI-FOOD SECTOR



IMPACT ON THE AGRI-FOOD SECTOR (OUTCOMES)



STRENGTHENING EUROPE'S AGRI-FOOD LEADERSHIP



EUROPEAN AI FACTORIES & AGRI DATA SPACES: A SYNERGISTIC LANDSCAPE



Data Union Ecosystem Actors

Data Holders

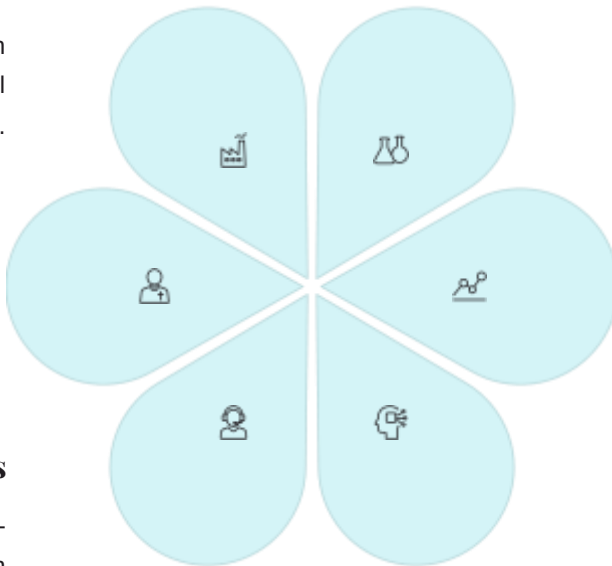
Companies, public sector bodies, and research institutions controlling valuable datasets. Retain full control over data access and usage conditions.

Regulators

European Data Innovation Board coordinating Member States. National authorities ensuring consistent implementation and enforcement.

Innovation Hubs

European Digital Innovation Hubs acting as user-facing contact points. Help match data needs with concrete applications and provide local support.



Data Labs

Specialized service facilities providing pooling, curation, pseudonymisation, and synthetic data generation. Bridge between data spaces and AI developers.

Data Spaces

Trusted ecosystems with clear governance rules. 14 strategic spaces spanning health, mobility, energy, manufacturing, and public administration.

AI Developers

Startups, scale-ups, and established companies building AI models. Access high-quality datasets through data labs while maintaining compliance.

This interconnected ecosystem ensures that data flows securely between actors while maintaining trust, protecting rights, and enabling innovation. Each actor plays a distinct role in transforming data availability into AI competitiveness.



T.C. SANAYİ VE
TEKNOLOJİ BAKANLIĞI



T.C. CUMHURBAŞKANLIĞI
DİJİTAL DÖNÜŞÜM OFİSİ



AgrInnovate EDIH

European Digital Innovation Hub



NEOHUB



İmeceMobil



yasad

YAZILIM SANAYİCİLERİ DERNEĞİ



What is a Data Space?

1

Definition

A data space is a distributed system defined by a governance framework that enables secure and trustworthy data transactions between participants while supporting trust and data sovereignty.

2

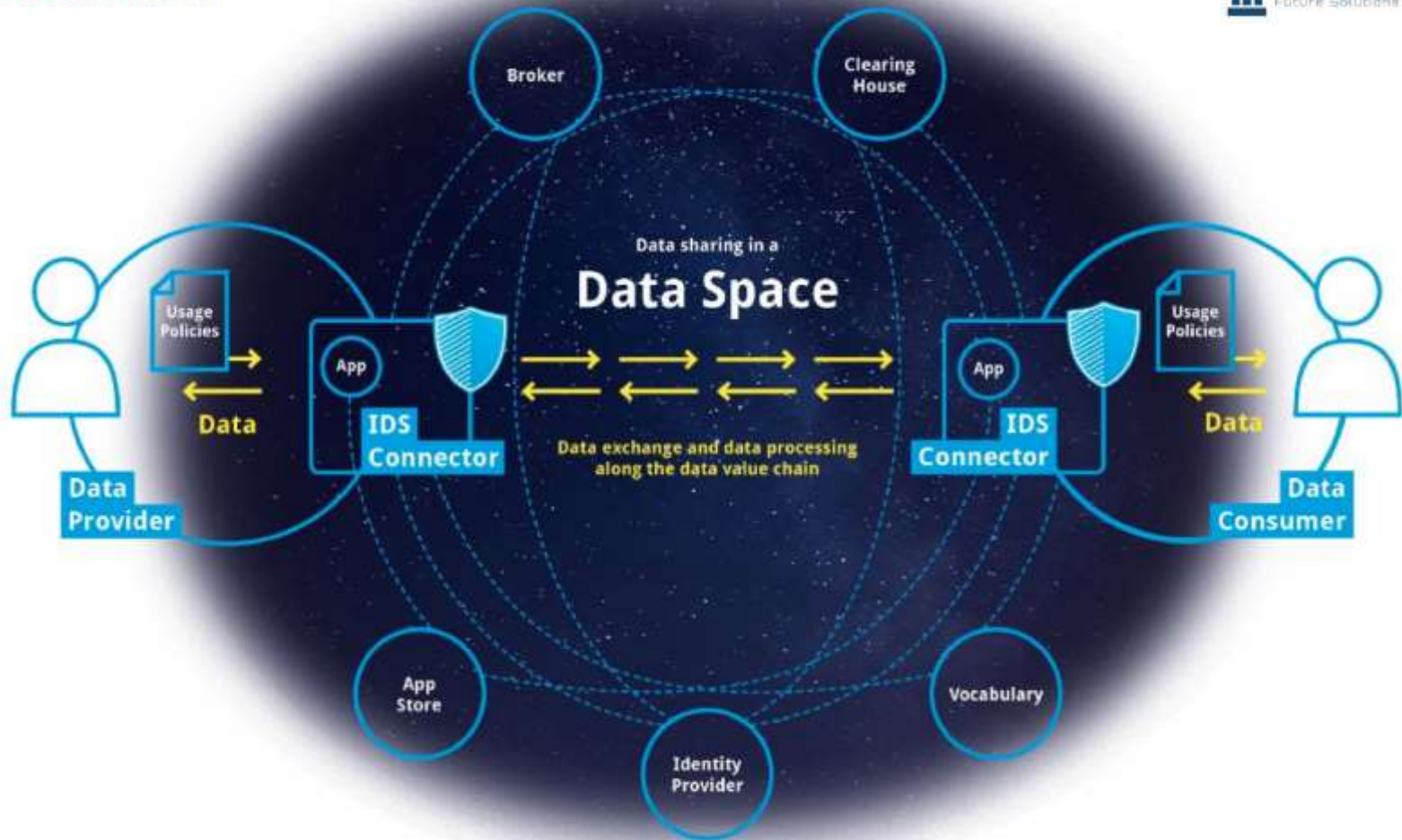
Key Components

Distributed system, governance framework, secure transactions, participants, data sovereignty, infrastructures, and use cases.

3

Data Ecosystem vs. Data Space

A data ecosystem is the broader marketplace for data exchange, while a data space provides the secure and governed infrastructure to facilitate trusted transactions within that ecosystem.

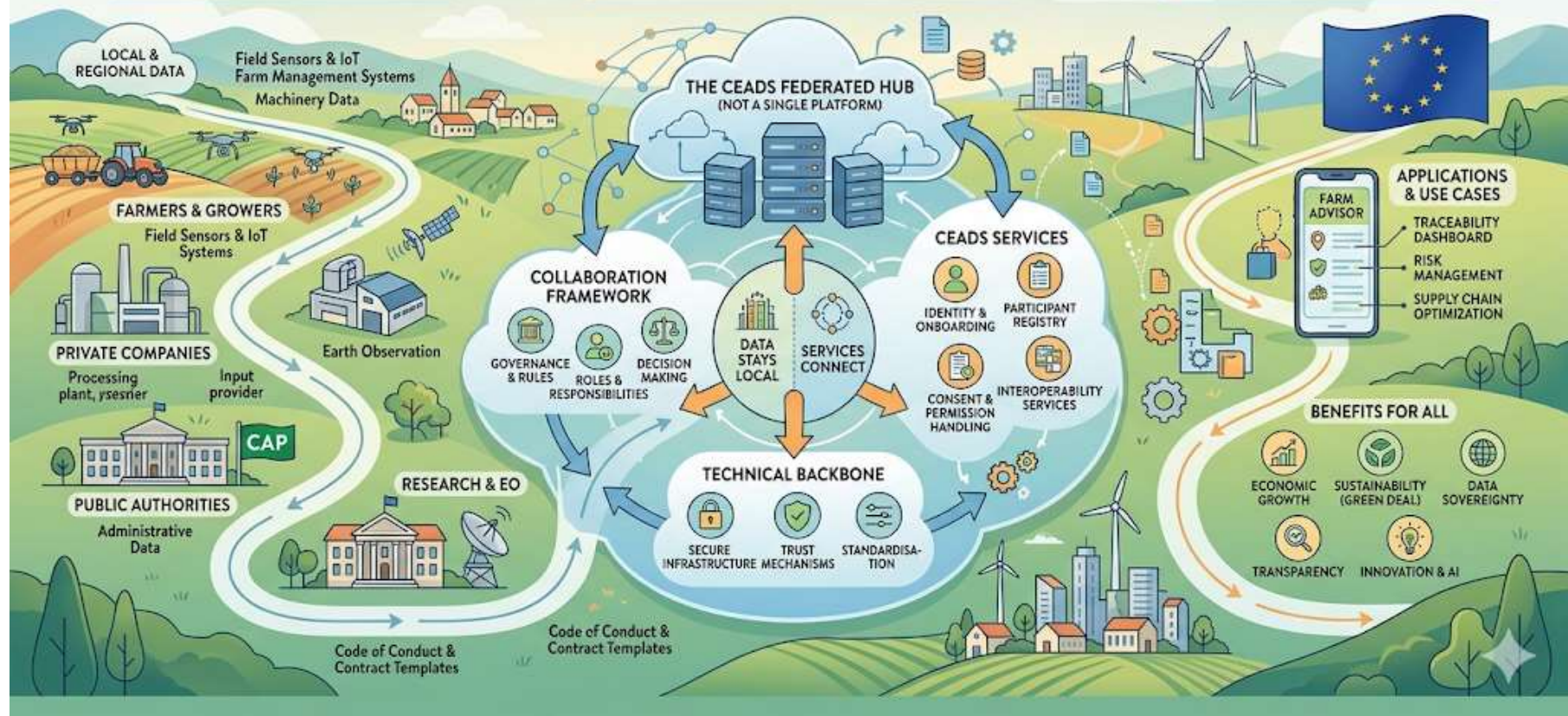


THE COMMON EUROPEAN AGRICULTURAL DATA SPACE (CEADS)

1. DATA SOURCES & PROVIDERS

2. THE CEADS CORE: A FEDERATED HUB

3. VALUE CREATION & IMPACT



'HORIZON EUROPE CO-FUNDED PARTNERSHIP: AGRICULTURE OF DATA (AgData)'

Accelerating Digital Transformation for Sustainable European Agriculture

OVERVIEW & GOALS



7+ YEAR INITIATIVE
(2025–2032)

BUDGET: €300 MILLION
30% EU, 70% Partner Co-funding

CORE OBJECTIVES:

- Enhance sustainability & resilience
- Strengthen policy monitoring (e.g., CAP, Green Deal)
- Boost competitiveness
- Integrate Earth Observation (EO) & Environmental Data

STRUCTURE & MECHANISMS



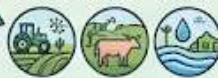
STRUCTURE & MECHANISMS

IMPLEMENTATION



JOINT CALLS (FSTP)
1ST CO-FUNDED CALL:
~€16 MILLION

USE CASES (UCs)



**DEPLOYING ACTIVITIES
IN AGRI BRANCHES**

**TOPIC 1:
DATA TECHNOLOGIES
& FAIR DATA**
• Interoperability

**TOPIC 2:
SOLUTIONS FOR
SUSTAINABLE
AGRICULTURE**
• Climate Adaptation

**TOPIC 3:
SOLUTIONS FOR
POLICY-MAKING**
• CAP Assessment

**HEALTHY KEY TOPICS
ON AGRI TOPICS**

KEY PILLARS & FOCUS

DATA INTEGRATION HUB



FEDERATED HUB

Creating secure, trusted connections

- EARTH OBSERVATION (ESA, Copernicus)
- FARM DATA (Tractors, Sensors)
- PUBLIC DATABASES (IACS)
- ENVIRONMENTAL DATA

AI & DATA ANALYTICS



ADVANCED TECHNOLOGIES

- Dataset-as-a-Service

- DATA CURATION
- AI-READY DATASETS
- PREDICTIVE MODELS

POLICY INDICATORS



EVIDENCE-BASED DECISIONS

- Reliable indicators of effects
- Tailored tools

LONG-TERM VISION & SYNERGIES



ROADMAP TO A COMMON EUROPEAN AGRICULTURAL DATA SPACE

- Enable seamless data sharing
- Foster private/public innovation
- Connecting Farmers, Policymakers, and Industry
- Synergies with:
 - Agroecology
 - Biodiversity
 - Animal Health & Welfare
 - Digital Europe
 - EU Space Programme

2025 - AgData Co-funded Call : Agricultural Partnership of Data

First co-funded call launched Nov 2025. Short proposal due Jan 21, 2026;
full proposal due July 21, 2026. Target a pilot on agrifood safety (AI for
pesticide/toxic risk in exports).



Project Vision

Primary Goal

Enable secure, interoperable, sovereign data sharing across Türkiye's agrifood ecosystem through the first Agricultural Dataspace.

Core Use Case

Toxic plant and early disease detection using AI-powered image analysis from drones.

Strategic Impact

- EU food-safety compliance
- Enhanced export readiness
- Future Digital Product Passport (DPP) adoption
- CEADS interoperability

Technology Integration



Imaging Systems

Onboard cameras mounted on drone capture field data.



AI Models

Machine learning algorithms detect toxic plants and early disease indicators.



Dataspace Tech

IDS-compliant sovereign infrastructure ensures secure, interoperable data sharing.



FAIR Research

Scientific validation and semantic modeling support data quality and reusability.

Strategic Benefits



Food Safety

Enhanced EU compliance through early toxic plant detection and disease monitoring, strengthening export capabilities.



Innovation

First Agricultural Dataspace in Türkiye, establishing foundation for future Digital Product Passport adoption.



Sovereignty

Secure, interoperable data sharing infrastructure that maintains Turkish control over agricultural data assets.



Ecosystem

Scalable platform connecting research, industry, and technology partners across the agrifood value chain.

Consortium Capability Map

Each partner description must be rewritten as a **capability-to-task argument** — showing exactly how each partner reduces one implementation risk. Avoid generic institutional profiles.



P1 Martin Bauer TR

Coordinator. Medicinal plant supply chain, field access, EU food safety compliance, ROI and biomass-loss prevention.



P2 FSSoftware

AI and software implementation. NDVI/CVI processing, geospatial outputs, integration with field workflows.



P3 Univ. Salamanca

AI methodology, model validation, explainability, algorithmic robustness, scientific credibility.



P4 Think.iT GmbH

Edge/cloud architecture, scalable data pipelines, MLOps, latency benchmarking, computational overhead mitigation.



P5 CIHEAM-IAMB

Agronomic validation, medicinal/aromatic crop expertise, transferability, training and advisory perspective.



P6 IDSA

Data sovereignty, IDS connectors, data governance, interoperability, access-control policy, open-access framework.

Toxic Plant Detection

- **Image Processing**
- **Artificial Intelligence**

Why?

PA/TA Breach (Alcohol)

Food Safety Risk

Cross-Border Rejection

Food Safety Risks: PA (Pyrrolizidine) / TA (Tropane) Alkaloids



Heliotropium europaeum



Senecio vulgaris



Datura stramonium



Solanum nigrum

Contaminant Type	High Risk Foods / Product Groups
Pyrrolizidine alkaloids (PA) — (Heliotropium, Senecio etc.)	Herbal teas/infusions, honey and bee products (especially floral blends), food supplements (pollen, plant powders), some spices, dried herbal products. The target organ is the liver!
Tropane alkaloids (TA) — (Mixtures of Datura and solanum nigrum species)	Herbal products/teas, baby food (special ML), spices, mustard, etc. Internal diseases and carcinogenic effects!

Food Safety Risks: Common PA/TA Alkaloids in Turkish Flora



Heliotropium europaeum



Senecio vulgaris



Datura stramonium



Solanum nigrum

Latin Name	Toxic Compound (s)	Symptoms of Toxination	Target Organ/System	Serious Conditions	Amount in Toxic Effect (Approx.)
Senecio vulgaris	Pyrrolizidine alkaloids (PA's)	Weakness, jaundice, abdominal pain, nausea	Liver	Veno-occlusive disease, cirrhosis, liver cancer	1–3 mg/kg PA, may develop with chronic toxicity
Datura stramonium	Tropane alkaloids (atropin, skopolamin)	Hallucinations, delirium, tachycardia, dry mouth	Nervous System, Heart	Convulsions, coma, death	0.1–0.3 mg/kg of atropine can be fatal (especially in children)
Heliotropium europaeum	Pyrrolizidine alkaloids (PA's)	Enlarged liver, jaundice, headache, loss of appetite	Liver	Chronic hepatotoxicity, liver cancer	1 mg/kg/day of PA can cause liver damage within a few weeks
Solanum nigrum	Solanin, saponins	Nausea, vomiting, diarrhea, dizziness	Digestive and Nervous Systems	Respiratory depression, coma, death	2–5 mg/kg of solanine¹⁹ can cause mild symptoms, 200–400 mg can be fatal

Cross Border Rejection



Nettle



Melissa



Mint



Fennel

Plant	Toxic Risk	Commonly Mixed Plants	Export Cases
Mint/Nettle	PA/TA	Senecio, Heliotropium	Blacklist risk, product recall Rejection from EU, mandatory analysis
Melissa	PA/TA	Senecio, Heliotropium Solanum nigrum	
Fennel	PA/TA	Datura stramonium Senecio, Heliotropium, Solanum nigrum	Border crossing refusal, commercial loss

Solution 1: Toxic Plant Detection by Image Processing



Camera Images

**FSNext-FSCore:
History,
Reporting,
Notifications**

**FSNext-FSSmart:
Image Processing
Services**

FSNext[®]



Solution 2: Toxic Plant Detection by AI Models



Camera Images

**FSNext-FSCore:
History,
Reporting,
Notifications**

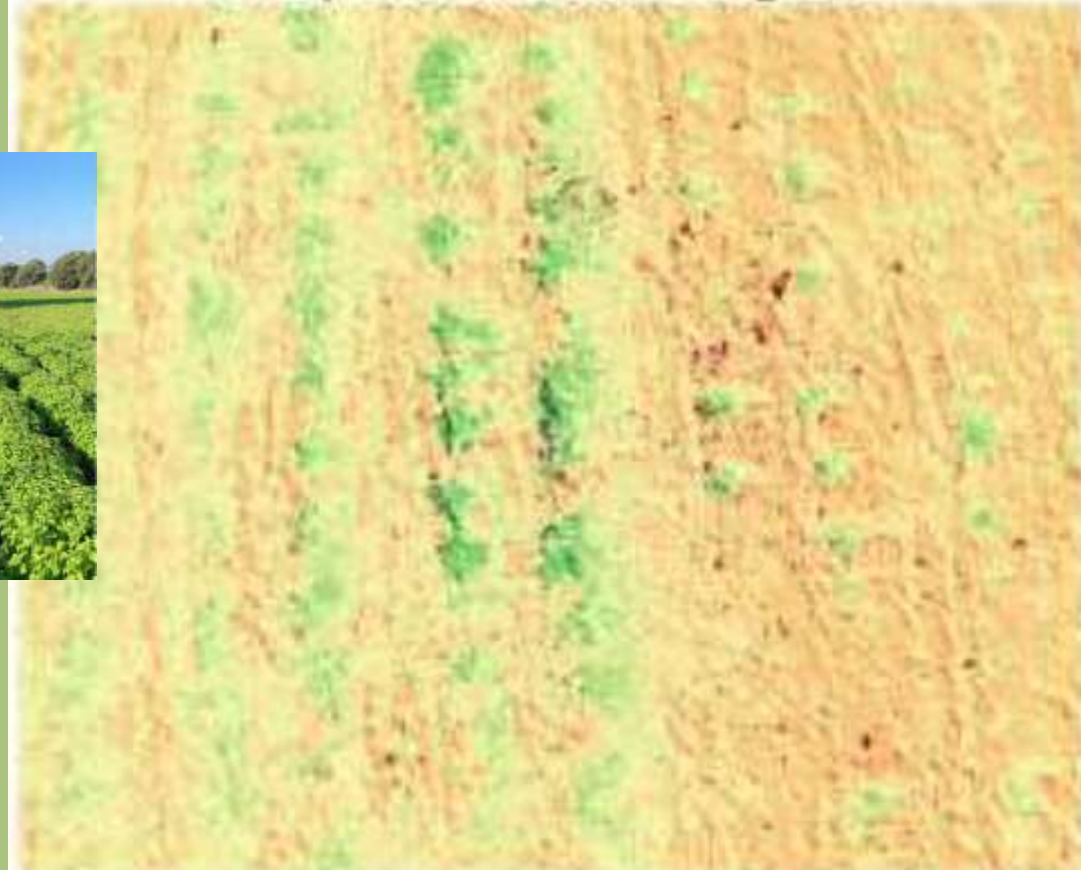
AI Models

FSNext[®]

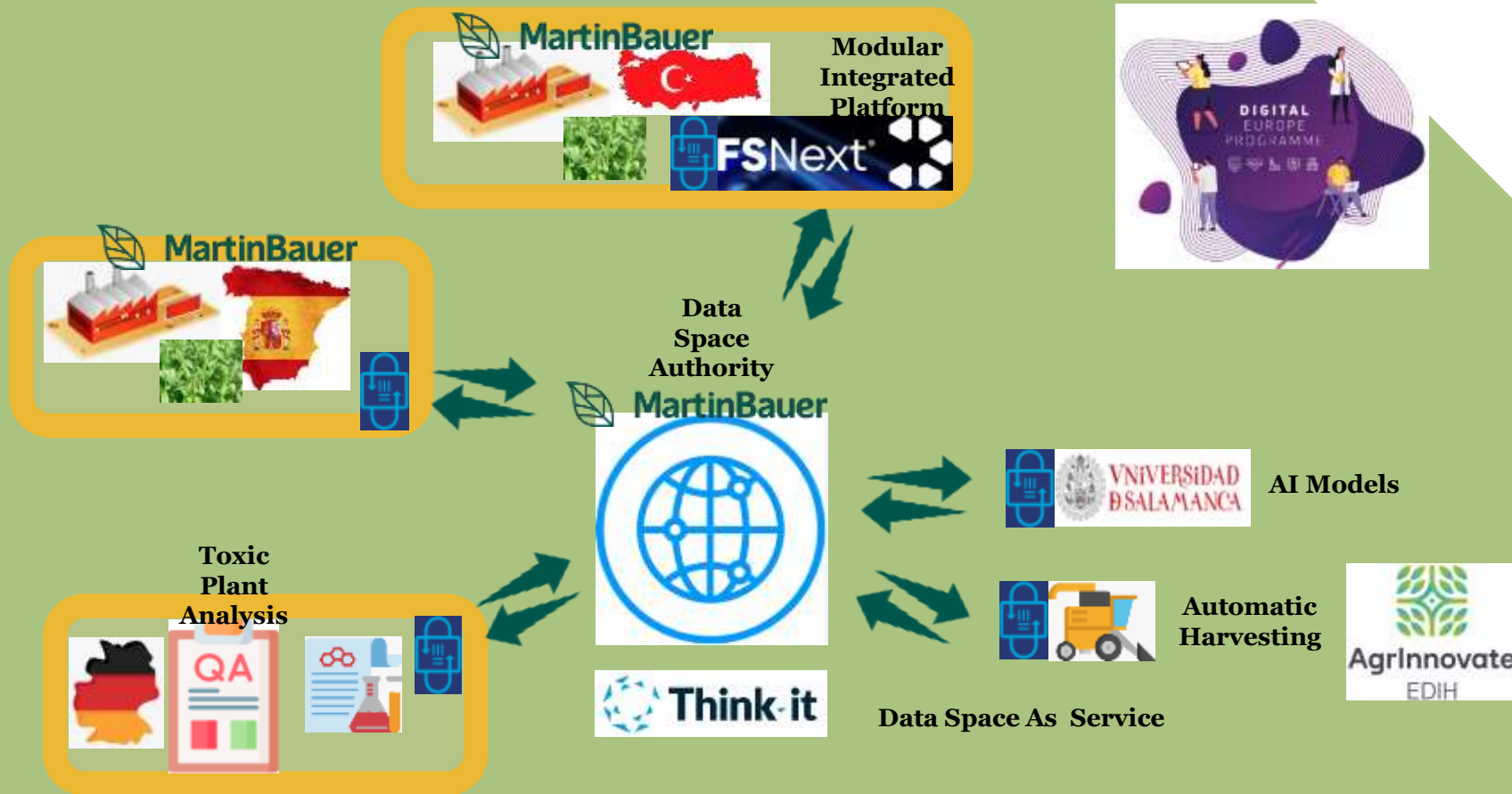


Toxic Plant Detection for Melissa

Toxic plant detection using NDVI



Solution 2 Alternative 1 : Horizon Call; Data Space & AI Models



Project Outlook

Transforming Turkish Agriculture

This project creates a scalable, interoperable agricultural dataspace that enables AI-driven toxic plant detection and strengthens EU food safety compliance.

Through sovereign data sharing, scientific excellence, strong industrial involvement, and alignment with AgData objectives, the project is well-positioned for successful evaluation and execution.

"Building the foundation for a data-driven, compliant, and competitive agricultural future."

