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# **TECHNICAL SPECIFICATION**

for the

## **Design, Development and Implementation of the Integrated Agricultural Information Platform (IAIP), including the State-owned Land Management Information System (SALMIS)**

**RFB No:** *AMP-GO-RFP-SC2.1-3*

**Project:** *Agriculture Modernization Project*

**Purchaser:** *Ministry of Agriculture, Forestry and  
Water Economy*



# Standard Bidding Document

## SECTION VII. TECHNICAL REQUIREMENTS (INCLUDING IMPLEMENTATION SCHEDULE)

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## Acronyms Used in the Technical Requirements

Term	Explanation
AFSARD	Agency for Financial Support of Agriculture and Rural Development
AMIS	Agricultural Market Information System
AMP	Agriculture Modernization <b>Project</b> , for which the MAFWE received financing from the World Bank
API	Application Programming Interface
AREC	Agency for Real Estate Cadastre
ATS	Acceptance Test for LPIS, JRC-defined quality test to verify LPIS compliance with EU requirements.
BI	Business Intelligence
CAP	Common Agricultural Policy
CC	Communication Client
CI/CD	Continuous Integration / Continuous Deployment (automated processes for building, testing, and deploying software)
COTS	Commercial Off-The-Shelf Software
CPU	Central Processing Unit
CRNM	Central Registry of North Macedonia
DB	Database
DBMS	Database Management System
DC	Data Center
DMS	Document Management System
DPI	Digital Public Infrastructure
DR	Disaster Recovery
EIF	European Interoperability Framework
ERP	Enterprise Resource Planning
Ethernet	IEEE 802.3 Standard LAN protocol
ETL	Extract, Transform, Load
ETS	External Test for LPIS, Field validation test comparing LPIS data with real parcel conditions
EU	European Union
FADN	Farm Accountancy Data Network
FOSS	Free Open-Source Software
FR	Farm Register
FSDN	Farm Sustainability Data Network
FVA	Food and Veterinary Agency
GB	Gigabyte

GDPR	General Data Protection Regulation
GIS	Geographical Information System
HA	High Availability
IACS	Integrated Administration and Control System
IAM	Identity and Access Management, Centralized system for managing user identities and access rights
IBRD	International Bank for Reconstruction and Development
ICT	Information and Communication Technology
IDS	Intrusion Detection System
INSPIRE	Infrastructure for Spatial Information in the European Community
IPARD	Instrument for Pre-Accession Assistance for Rural Development
IPS	Intrusion Prevention System
IS	Information System/s
ISET	Information System for Evidence of Tobacco
ISO	International Organization for Standardization
IT	Information Technology
ITNR	NMK abbreviation for the Identification code of agricultural holding
JRC	Joint Research Centre, Scientific and technical body of the European Commission
KB	Kilobyte
LAN	Local area network
LDAP	Lightweight Directory Access Protocol
LFA	Less Favoured Areas, Areas with natural or socio-economic constraints eligible for compensatory support under CAP
LPIS	Land Parcel Identification System
LU	Livestock Unit
MAF	Manufacturer Authorization Form
MAFWE	Ministry of Agriculture, Forestry and Water Economy
MB	Megabyte
MDC	Main Data Center
MDT	Ministry of Digital Transformation
MFA	Multi-Factor Authentication
ML	Machine Learning
MOEPP	Ministry of Environment and Physical Planning
M&E	Monitoring & Evaluation
NGFW	Next Generation Firewall (advanced network security device providing deep packet inspection and intrusion prevention)

NIC	Network interface card
NIF	National Interoperability Framework
NIP	National Interoperability Platform
NOS	Network operating system
NSDI	National Spatial Data Infrastructure
OAuth	Open Authorization
ODBC	Open Database Connectivity
OLAP	Online Analytical Processing
OLE	Object Linking and Embedding
OLTP	Online Transaction Processing
OS	Operating System
PEMP	Public Enterprise for Management of Pastures
PIS	Phytosanitary Information System
PS	PostScript – Adobe page description language
QA	Quality Assurance
QC	Quality Control
RAM	Random access memory
RBAC	Role-Based Access Control
RD	Rural Development
RDBMS	Relational Database Management System
REST	Representational State Transfer (web service communication protocol)
RPO	Recovery Point Objective
RTO	Recovery Time Objective
SAI	State Agricultural Inspectorate
SALMIS	Information System for Management of State-Owned Agricultural Land
SLA	Service Level Agreement
SOAP	Simple Object Access Protocol (web service communication protocol)
SQL	Structured Query Language
SSO	Single Sign On
TCP/IP	Transmission Control Protocol / Internet Protocol
ToR	Terms of Reference
UAA	Utilized Agricultural Area
UAT	User Acceptance Testing
UAV	Unmanned Aerial Vehicle (Drone)
UI	User Interface

VIS	Veterinary Information System
VM	Virtual Machine
VMware	Virtualization platform
VPN	Virtual Private Network

# TECHNICAL REQUIREMENTS

## A. BACKGROUND

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The Agriculture Modernization Project (AMP) aims to improve competitiveness in targeted agricultural sub-sectors in North Macedonia and to strengthen public sector readiness for the country's accession to the European Union (EU). The project was approved by the World Bank on January 30, 2020 and its closing date is December 31, 2027. AMP is aligned with the World Bank Country Partnership Framework for North Macedonia and supports national priorities for improved connectivity and access to markets, as well as engagement goals related to a more productive rural economy and improved livelihoods for underserved groups.

The AMP is also aligned with the National Strategy for Agriculture and Rural Development 2021–2027, which is the main long-term strategic document guiding agricultural and rural development policy and measures in the country. The Strategy defines three core strategic goals: (i) improving competitiveness and income sustainability of agricultural holdings, (ii) applying environmental practices that contribute to climate change mitigation and adaptation, and (iii) ensuring sustainable rural development. For the first time, monitoring and evaluation of the Strategy is expected to be supported through a comprehensive indicator and reporting framework.

Under AMP Component 2 – Institutional Capacity for EU Accession, Sub-component 2.1 (Evidence-Based Policymaking), the Ministry of Agriculture, Forestry and Water Economy (MAFWE) will strengthen its data management, monitoring and reporting capabilities. A key activity under this sub-component is the establishment of a modern, integrated information environment that consolidates critical administrative and sectoral datasets into a single platform.

In this context, MAFWE intends to establish the Integrated Agricultural Information Platform (IAIP) as a unified software platform that will replace multiple existing “island” IT solutions, address data fragmentation and duplication, and provide standardized, secure and interoperable data services for the agricultural sector. The IAIP will serve as the Ministry's central transactional and information management platform and will constitute the primary source of consistent, validated and auditable data for operational processes and evidence-based decision-making.

A major subsystem of the IAIP is the Information System for Management of State-Owned Agricultural Land (SALMIS), which will support the management of state-owned arable agricultural land under MAFWE jurisdiction and state-owned pastures under the Public Enterprise for Management of Pastures (PEMP). In addition to alphanumeric inventories and process management, SALMIS will introduce and maintain a graphical (geospatial) register of leased state-owned agricultural land and pastures, enabling spatial visualization and management of lease areas and related land-use information, and supporting improved inventory accuracy and oversight.

Through the IAIP, MAFWE will also ensure the migration of historical data from existing IT solutions and improve the quality, accuracy and consistency of data that will feed into future analytical and reporting capabilities (including Business Intelligence solutions used for

monitoring and evaluation). The IAIP will provide standardized web services (APIs) to enable secure access to selected data by other institutions and users in compliance with national e-government interoperability and cybersecurity standards.

A high-level analysis of the current IT landscape and legally mandated information assets is available as background to this Technical Specification (TS) ToR and is provided through annexed materials. In particular, the methodology for establishing the graphical layer (geospatial register) of leased state-owned agricultural land is provided as an annex to this TS and shall be used by the Supplier as a key reference during implementation.

By implementing the Integrated Agricultural Information Platform (IAIP), the Ministry of Agriculture, Forestry and Water Economy (MAFWE) will significantly enhance the efficiency, transparency and accountability of its operations, while establishing a modern, interoperable and sustainable digital foundation for agricultural data management. The IAIP will enable the consolidation of key administrative systems, lists and records into a unified environment, improve data quality and consistency, and support evidence-based policy-making and strategic planning.

Through the integration of advanced transactional capabilities, standardized data exchange mechanisms and geospatial functionalities – particularly through the implementation of the SALMIS subsystem and its graphical register of state-owned agricultural land – the IAIP will strengthen the management of public land resources, improve monitoring of land use and lease agreements, and enhance revenue oversight. At the same time, the platform will contribute to the strengthening of the national digital public infrastructure, ensure alignment with EU interoperability, cybersecurity and data governance practices, and provide a scalable framework capable of supporting future digitalization initiatives in the agricultural sector.

## **0.1. The Purchaser**

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The Purchaser is the Ministry of Agriculture, Forestry and Water Economy (MAFWE) of the Republic of North Macedonia. MAFWE is the central public institution responsible for agriculture, rural development, and water economy policy and oversight, and plays a key role in implementing national strategic objectives and alignment with EU acquis in the agricultural sector.

Within MAFWE, several organizational units will directly benefit from and contribute to the implementation of the IAIP, including, inter alia:

- the Sector for Agriculture Policy Analysis;
- the Sector for Rural Development;
- the Sector for Agriculture;
- the Sector for Viticulture, Vine and Fruit Growing;
- the Sector for International Cooperation; and
- the Sector for Management of EU Pre-Accession Funds for Rural Development (IPARD).

MAFWE performs an operational role through a network of branch offices across the country. In the context of land management, a significant number of branch offices are directly involved in procedures related to state-owned agricultural land, including contracting, monitoring and

record maintenance. These offices will require secure web-based access to the IAIP and associated subsystems, including SALMIS, according to their roles and responsibilities.

In addition to MAFWE, other public institutions and entities under its responsibility or operational coordination will use and interact with the IAIP and its subsystems. This includes the Agency for Financial Support of Agriculture and Rural Development (AFSARD), which will interact with IAIP data as required for program implementation and reporting, but is not part of the internal organizational structure of the Ministry.

For the purposes of state-owned pasture management, the Public Enterprise for Management of Pastures (PEMP) is a key stakeholder and user entity. PEMP is responsible for the allocation and management of state-owned pastures through its own organizational structure and regional units. SALMIS will support and streamline relevant pasture-related procedures in coordination with PEMP responsibilities and legal framework requirements.

## **0.2. Business Objectives of the Purchaser**

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MAFWE's overarching business objective is to establish the Integrated Agricultural Information Platform (IAIP) as a unified software platform that modernizes and consolidates agricultural and rural development information management. The IAIP will replace multiple heterogeneous and partially overlapping IT solutions that have resulted in data fragmentation, duplication and inconsistent quality, and will provide a standardized and scalable environment serving as a single source of truth for the Ministry's operations.

The IAIP will support evidence-based policy-making and improved service delivery through (i) standardized data models and shared codebooks, (ii) secure migration and preservation of historical data, (iii) improved data quality and consistency, resulting from the use of a single, centralized source of data across the integrated platform, ensuring uniform data definitions, reduced duplication, and consistent reporting and analytical outputs, and (iv) standardized and secure data exchange services (APIs) to support inter-institutional collaboration via the National Interoperability Platform and, where needed, via direct system-to-system interconnection.

The IAIP will also strengthen monitoring and evaluation capabilities by enabling efficient data collection, validation and consolidation, thus supporting comprehensive reporting and analytical solutions, including future Business Intelligence environments. Automated reporting processes are expected to reduce manual work, minimize errors and enable staff to focus on value-added activities.

### **0.2.1. Business-Specific Objectives of the Integrated Agricultural Information Platform (IAIP)**

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A key objective of the IAIP is to consolidate the functions of existing administrative information systems currently used by MAFWE (often referred to as administrative systems), which represent major sources of operational and sectoral data. The platform will provide a unified environment for managing core entities and processes related to the Ministry's mandate, ensuring that data is collected, stored and maintained under consistent validation rules, standardized classifications and shared reference code lists.

The IAIP is expected to consolidate and/or replace multiple existing “island” solutions and provide a coherent transactional and information backbone for the Ministry, including the maintenance of lists and records that the Ministry is legally mandated to establish and maintain. Depending on their nature, these information assets may range from simple lists (with basic CRUD and reporting features) to more complex registries requiring workflows, approvals, audit trails, and – in selected cases – spatial components and defined processes to ensure data currency and integrity.

Furthermore, the IAIP will provide standardized and secure web services (APIs) for relevant lists and records, to be published through the National Interoperability Platform, enabling other public institutions and, where appropriate, citizens to securely access data in line with national e-government interoperability and security standards. This will improve transparency, strengthen inter-institutional collaboration and contribute to the wider digital public infrastructure of North Macedonia.

### **0.2.2. Business Specific Objectives related to SALMIS**

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A major business objective of the Purchaser is to establish and operationalize SALMIS as a key subsystem within the IAIP, providing an advanced information solution for the management of state-owned arable agricultural land and state-owned pastures. SALMIS shall streamline and enhance procedures related to leasing, contract management, monitoring and revenue-related processes, while improving transparency, accountability and data availability for decision-makers within MAFWE and PEMP.

SALMIS will support the creation and maintenance of an up-to-date inventory of state-owned agricultural land and pastures, addressing the current absence of reliable and current inventories and the challenges faced by institutions in managing these assets throughout their life cycle. The system will improve the ability of the Government to manage state-owned land sustainably and in a financially responsible manner and will enable better planning and evidence-based land policy.

SALMIS shall ensure two-way interoperability with the existing Farm Register (FR) and Land Parcel Identification System (LPIS). In particular, SALMIS shall be able to verify whether applicants for lease are registered in FR and, where required and legally permitted, create or update FR records through secure API calls in accordance with FR validation rules. SALMIS shall also leverage LPIS spatial data and provide GIS-enabled functionalities supporting the management of land parcels, leased areas and related spatial attributes.

SALMIS will incorporate processes relevant to MAFWE’s management of state-owned agricultural land (e.g., leasing through public notices/calls, annexes, transfer of user rights, changes in crops, usufruct, real servitude, land consolidation, sale procedures, and other legally defined procedures), and for PEMP the management of pasture-related contracts and associated procedures. The system will improve revenue monitoring by enabling tracking of payments, issuing reminders and supporting enforcement of contractual terms where applicable.

To support field operations and oversight, SALMIS will provide access through web-based interfaces and support mobile access to selected functionality, subject to role-based access control and cybersecurity requirements.

### **0.3. Information Technologies Relevant to the Information Platform**

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The Integrated Agricultural Information Platform (IAIP) will be implemented within an environment that includes existing operational information systems, temporary transitional applications, and new systems and modules to be developed under this assignment. For clarity and to avoid ambiguity regarding the scope of work, the relevant information technologies are grouped below according to their current status and intended role within the IAIP.

#### **0.3.1. Existing information systems to be redesigned to a limited extent and incorporated into the IAIP**

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As part of the IAIP implementation, the following existing operational information systems will be subject to limited technical redesign, modernization and architectural incorporation as native modules of the IAIP, rather than simple technical integration. These systems represent core business domains of the MAFWE and will be technically re-engineered to a limited extent to comply with the IAIP architecture, data models, security framework, interoperability principles and operational requirements.

##### **Clarification on the Scope for a limited extent of Redesign and Reengineering**

For the avoidance of doubt, the redesign and reengineering activities referred to in this section shall not imply a fundamental redefinition of legally established business processes, institutional mandates, or registry structures currently implemented within MAFWE.

The IAIP initiative is primarily aimed at technical modernization, architectural harmonization, and interoperability enablement of existing systems wherever feasible.

The project does not include revision of primary or secondary legislation. Core business rules, legally defined procedures, and functional workflows shall remain substantively aligned with the current regulatory framework in force.

Any potential proposals for legislative amendments that may arise during system implementation shall be communicated to MAFWE for consideration within its established institutional mechanisms.

Where improvements or optimizations of business processes are identified, such adjustments shall be limited to technical streamlining, removal of redundancies, alignment with the unified IAIP data model, and digital automation enhancements, without altering the legal substance of the procedures.

If additional data attributes are required (e.g., for Monitoring & Evaluation, cross-registry reporting, or interoperability purposes), MAFWE shall provide a predefined list of required data elements. The Supplier shall be obliged, as part of the project scope, to implement such additions. However, the Supplier shall not be responsible for conducting independent institutional analysis or redefining registry concepts.

Limited extent of the reengineering within the meaning of this contract primarily refers to:

- replacement of legacy technical architectures with IAIP-compliant modular architecture;
- harmonization of data structures with IAIP core entities and shared code lists;
- implementation of standardized API-based interoperability (including migration from direct database integrations to service-based exchange through the National Interoperability Platform);
- enhancement of cybersecurity, audit logging, performance, and access control mechanisms.

The systems to be redesigned to the extent clarified above and incorporated into the IAIP include:

- Farm Register (FR)
- Land Parcel Identification System (LPIS)
- Monitoring Software for Agricultural Cooperatives
- Information System for Evidence of Tobacco (ISET)
- Information System for Agricultural Products Buyers
- Organic Production Information System
- Agricultural Market Information System (AMIS)

The redesign of these systems shall include, ~~inter alia~~:

- technical analysis and controlled process optimization in alignment with existing legal procedures;
- redesign and harmonization of data models with IAIP core entities and shared code lists;
- redevelopment of application components in line with the IAIP technical architecture;
- migration of historical data from legacy implementations;
- implementation of standardized APIs and interoperability mechanisms; and
- alignment with IAIP cybersecurity, audit logging, performance and access control requirements.

### **0.3.2. Existing temporary and transitional applications**

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In the context of managing state-owned agricultural land, MAFWE has established temporary applications to support data collection and preparation activities prior to the full implementation of SALMIS. These applications are interim solutions only and are not intended for long-term operational use.

The temporary applications include:

- Temporary Inventory Application for State-Owned Agricultural Land, used for entering and maintaining records of lease contracts for state-owned arable agricultural land and pastures;
- Application for Uploading Geodetic Elaborates, used for collecting and managing geodetic documentation related to lease agreements and serving as a source for the creation of the graphical (geospatial) layer of state-owned agricultural land.

Upon completion of data entry activities and validation, all relevant data from these temporary applications shall be migrated into SALMIS. A backup of the data state may be performed prior to and/or after migration for archival purposes. Following successful migration and acceptance, the operational use of these temporary applications shall be discontinued and their lifecycle terminated.

### **0.3.3. Systems and subsystems to be developed under the IAIP**

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Under this assignment, the following systems and functional modules shall be designed, developed and implemented as integral parts of the IAIP:

- SALMIS – Information System for Management of State-Owned Agricultural Land, implemented as a major subsystem of the IAIP, providing comprehensive functional and geospatial support for the management of state-owned arable agricultural land and pastures, and tightly integrated with the Farm Register and LPIS;
- Modules for management of registries and domain-specific datasets for which MAFWE has a legal mandate to establish and maintain, and for which no dedicated IT solutions currently exist. Depending on their nature, these modules may range from simple lists to more complex information assets requiring workflows, approvals, audit trails and, where applicable, spatial components (a detailed list and description of all such registries and domain-specific datasets covered under this scope are provided in Annex B)

### **0.3.4. External systems and interoperability environment**

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In addition to the systems described above, the IAIP shall be interoperable with existing information systems operated by MAFWE and by other public institutions. Interoperability and data exchange shall be achieved through the National Interoperability Platform, or through direct system-to-system connections for institutions not yet connected to the national platform.

At a minimum, interoperability shall be established with the following systems and institutions:

- Central Registry of the Republic of North Macedonia – company and legal entity data;
- Ministry of Digital Transformation – National Population Register;
- Agency for Real Estate Cadastre (AREC) – cadastral and land registration software (eKat), cadastral parcels and land-related data, NSDI portal;
- Food and Veterinary Agency – animal-related data;
- Public Enterprise for Management of Pastures (PEMP) – data on leased state-owned pastures; interoperability with the JonGIS system owned by PEMP shall be established for the purpose of data exchange related to lease contracts and relevant spatial and alphanumeric data, without affecting PEMP’s internal operational and accounting processes.
- 
- State Statistical Office – statistical data related to agricultural production.
- Agency for Financial Support of Agriculture and Rural Development – operational data related to applications, approved measures, and subsidy payments;
- Ministry of Finance - information on executed subsidy payments as well as payments made under lease agreements

This list is not exhaustive and may be expanded in the future to include additional institutions, subject to the existence of a legal basis and technical feasibility.

Any such expansion shall be subject to separate assessment, agreement between the Parties, and, where applicable, contract amendment including corresponding adjustment of scope, timeline, and budget.

### **0.3.5. Security and data exchange principles**

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All data exchanges between the Integrated Agricultural Information Platform (IAIP) and external information systems shall be implemented through standardized, secure and encrypted communication channels, in compliance with applicable national legislation and standards on cybersecurity, personal data protection and interoperability.

As a primary principle, interoperability and data exchange shall be realized through the National Interoperability Platform, under the jurisdiction of the Ministry of Digital Transformation, in order to ensure a centralized, controlled and auditable mechanism for inter-institutional data sharing in line with national e-government policies. The majority of the institutions with which IAIP is expected to exchange data, as mentioned above, are already part of the National Interoperability Platform, including the Central Registry of the Republic of North Macedonia, Ministry of Digital Transformation, the Agency for Real Estate Cadastre, the Food and Veterinary Agency, and the State Statistical Office.

Only in cases where relevant institutions are not yet connected to the National Interoperability Platform, data exchange may be implemented through direct system-to-system connections, such as secure API calls or other technically appropriate mechanisms. Such direct connections shall be considered an exception, shall be properly documented and approved, and shall comply with the same security, access control, logging and data protection requirements applicable to interconnections realized through the National Interoperability Platform. Direct database-level connections (e.g. database links) are not preferred and shall be used only where justified by technical constraints and explicitly approved by the Purchaser.

## **0.4. Available Training Facilities to Support the Implementation of the Information Platform**

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The Ministry of Agriculture, Forestry and Water Economy (MAFWE) has existing training facilities that can be used to support the implementation of the IAIP, including user training, workshops and capacity-building activities.

MAFWE has two (2) large training halls with a capacity of up to 50 participants each, as well as several conference rooms that can accommodate up to 20 participants per session. These facilities are suitably furnished with chairs, desks and conference tables, and are equipped with both wireless (Wi-Fi) and wired internet connectivity. Electrical power outlets and extension cords are available to support the use of laptops and other training equipment.

The availability of these facilities will enable the organization of centralized and decentralized training sessions for different user groups, including administrators, operational users from headquarters and branch offices, and other stakeholders involved in the use of the IAIP and its subsystems, including SALMIS.

## **B. BUSINESS FUNCTION AND PERFORMANCE REQUIREMENTS**

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### **1.1. Functional and Technical Coverage**

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The Integrated Agricultural Information Platform (IAIP) shall serve as the central transactional, registry and analytical platform of the MAFWE. The IAIP is intended to consolidate a wide range of existing standalone (“island”) information systems into a unified and interoperable environment, ensuring that all agricultural and rural development registries and lists that MAFWE is legally obliged to establish and maintain are supported within a single platform.

The platform shall provide a harmonized framework for agricultural information management, based on standardized data models, shared codebooks and centralized metadata management. Through this approach, the IAIP shall address existing fragmentation, improved data quality and consistency, resulting from the use of a single, centralized source of data across the integrated platform, ensuring uniform data definitions, reduced duplication, and consistent reporting and analytical functions of the Ministry.

A key objective of the IAIP is to provide a solid transactional foundation for the Business Intelligence (BI) platform, which shall serve as the analytical layer for monitoring and evaluation (M&E). Records originating from IAIP modules shall feed the data warehouse and BI tools, enabling evidence-based policymaking and efficient performance monitoring.

Within the IAIP, the State-Owned Agricultural Land Management Information System (SALMIS) shall be implemented as a major functional subsystem. SALMIS shall support the management of state-owned arable agricultural land and pastures and shall be tightly integrated with core IAIP modules, in particular the Farm Register (FR) and the Land Parcel Identification System (LPIS). Through SALMIS, the IAIP shall introduce a graphical, GIS-based register of state-owned agricultural land and pastures, combining spatial and alphanumeric data within a single operational environment.

In addition to its core transactional and registry role, the IAIP shall provide standardized and secure application programming interfaces (APIs) for all supported registries and modules. These interfaces shall be primarily published and consumed through the National Interoperability Platform, enabling controlled and auditable data exchange with other public institutions and external stakeholders, in line with national e-government and information security standards.

### **1.2. Existing Information Systems and Rationale for Consolidation**

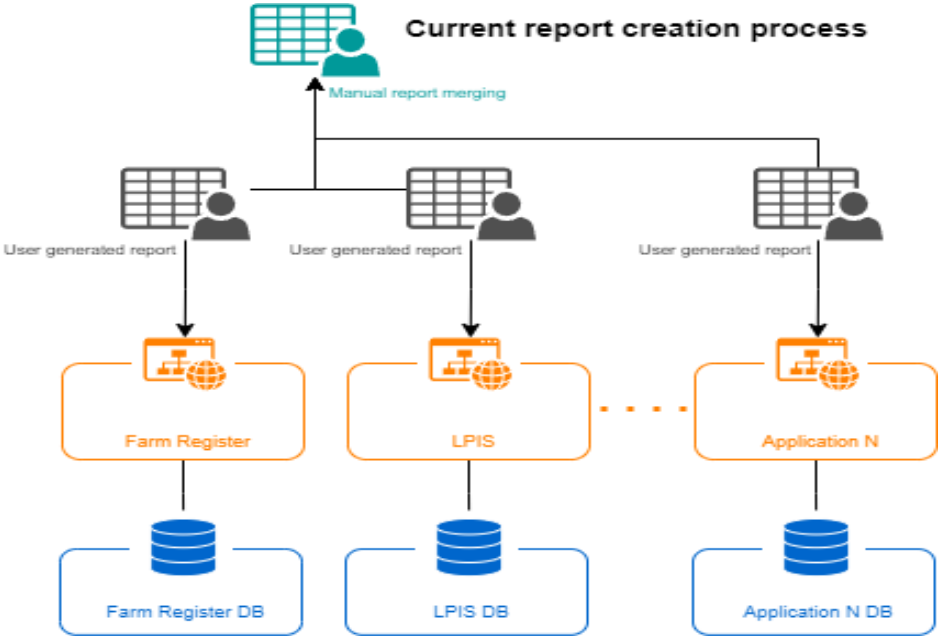
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MAFWE currently operates a number of information systems that have been developed at different times, using heterogeneous technologies and architectures. These systems include mission-critical solutions such as the Farm Register (FR) and the Land Parcel Identification System (LPIS), as well as specialized applications supporting tobacco production (ISET), agricultural product procurement, phytosanitary controls, farm accounting (FADN) and various administrative processes (Annex B).

While some of these systems are partially interconnected—often through direct database links or custom APIs—many operate as isolated applications without standardized data exchange mechanisms. In addition, several legally mandated registries are still maintained outside formal IT systems, frequently in spreadsheets or office documents. This fragmented landscape results in duplicated data, inconsistent information, limited interoperability and inefficient reporting processes.

In practice, reporting and analytical tasks often require manual extraction, consolidation and reconciliation of data from multiple sources, as illustrated in Figure 1 below. Such manual processes increase the risk of errors, reduce data reliability and delay decision-making.

**Figure 1 – Manually creating reports**



The future IAIP shall address these challenges by consolidating or replacing most legacy solutions with a unified, modular and interoperable platform. Core registries such as the Farm Register and LPIS shall be redeveloped in line with a guidance in chapter 0.3.1. as native IAIP modules, while sector-specific systems (e.g. tobacco, organic production, agricultural product buyers) shall be incorporated through dedicated functional modules. Certain systems, such as Enterprise Resource Planning (ERP) solutions or institutional websites, may continue to operate independently where full integration is not required.

A detailed assessment of existing IT systems, together with recommendations for their modernization, replacement or integration, is provided in Annex A – Analysis of Existing IT Solutions. In parallel, Annex B – Legal and Functional Analysis of Registries under MAFWE’s Mandate establishes the legal and operational basis for defining the functional scope of the IAIP, including registries supported through SALMIS.

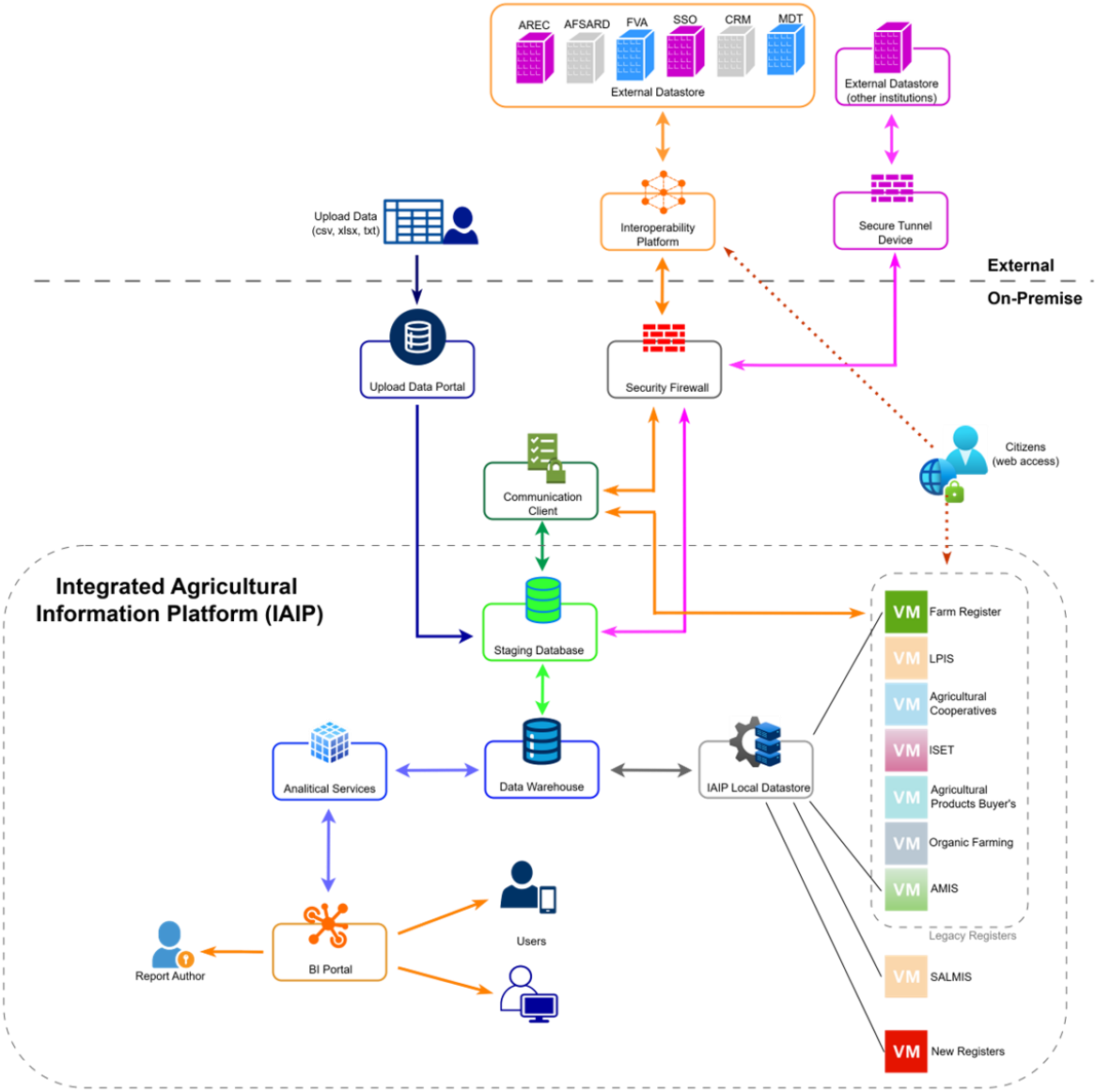
**1.3. Architectural Requirements**

The IAIP shall be designed as a multi-tier, service-oriented architecture, ensuring security, scalability and long-term sustainability. The architecture shall clearly separate presentation, application, integration, interoperability and data layers, while supporting both alphanumeric and GIS-enabled components within a shared platform framework.

Access to the system shall be provided through secure internal networks for authorized users, while external access and data exchange shall be realized through standardized and secure interfaces. Interoperability with external institutions shall be achieved primarily through the National Interoperability Platform operated by the Ministry of Digital Transformation, complemented by secure direct interconnections where legally and technically justified.

The conceptual architecture of the IAIP is illustrated in Figure 2 below and includes, inter alia, registry modules, data collection services, staging and migration components, a centralized data warehouse and BI tools for analysis, reporting and evaluation.

**Figure 2 – Block Diagram of Integrated Agricultural Information Platform**



From a data perspective, the architecture shall combine an operational database for transactional and registry management, a staging area for data migration and validation, and a data warehouse for analytical storage. Business Intelligence tools shall provide reporting, dashboards and analytical capabilities based on harmonized and high-quality data.

### **1.4. Systems Administration and Management**

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The IAIP shall provide comprehensive system administration and management functions implemented in an integrated and centralized manner across all modules and subsystems, including SALMIS. These functions shall cover user and role management, configuration and codebook administration, monitoring of system health and performance, management of APIs and interoperability services, and comprehensive logging and audit capabilities.

High availability and disaster recovery mechanisms shall be implemented in alignment with MAFWE’s existing ICT infrastructure strategy and operational platforms. Within the scope of this Project, only a limited procurement of hardware is foreseen, consisting of two (2) servers to support the IAIP workloads and two (2) next-generation firewall devices to strengthen network security. No additional dedicated hardware or standalone software solutions for high availability or disaster recovery shall be procured under this Project.

The IAIP solution shall be designed, deployed and configured to operate on the existing MAFWE virtualization, backup, storage and recovery infrastructure, leveraging the available mechanisms for backup, restore and failover in accordance with the Ministry’s established policies. This approach shall ensure business continuity, data protection and full traceability of administrative actions, user access and data changes, in compliance with national information security policies.

### **1.5. Performance, Reliability and Scalability Requirements**

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System performance, reliability and scalability represent critical requirements for the IAIP. The platform shall be designed to support increasing volumes of data, a growing number of registries and modules, and concurrent access by users at central, regional and external levels.

The IAIP shall ensure high availability of core infrastructure components, fault-tolerant database and application services, and secure, load-balanced network connectivity. Defined service-level targets shall be met for system availability, response times and recovery objectives. Performance requirements shall address both alphanumerical transactions and GIS-based operations, ensuring acceptable response times for interactive use, analytical queries and complex spatial processing.

Scalability shall be a fundamental design principle, allowing the gradual expansion of the platform over a multi-year operational horizon without degradation of performance or service quality. Detailed performance benchmarks, stress testing and capacity planning results shall be provided by the Supplier as part of the implementation.

### **1.6. Functional Requirements**

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The IAIP shall support the modernization and consolidation of MAFWE’s core business functions by providing a unified environment for data collection, validation, processing and analysis. The platform shall support registry and domain-specific datasets management, workflow-based processing, notification services, metadata and codebook administration, data migration and secure publication of services through standardized APIs.

As an integral part of the platform, the IAIP shall include a GIS-enabled environment for the management, visualization and analysis of spatial data relevant to agricultural land, parcels, holdings and related domain datasets. The GIS component shall support both internal operational needs of MAFWE and controlled external data sharing and shall be designed in compliance with the Law on National Spatial Data Infrastructure (NIPP) and the INSPIRE Directive, ensuring interoperability, standardized spatial services and harmonized metadata.

Through its integration with the data warehouse and BI platform, the IAIP shall enable advanced reporting, dashboards and analytical insights, including spatially enabled analyses, supporting evidence-based policy design, monitoring and evaluation. Secure access mechanisms and network security controls, including next-generation firewalls, shall ensure reliable, resilient and compliant operation of the platform.

In addition, the IAIP shall provide a web portal enabling both restricted (authenticated) and public access to data and services, in accordance with defined user roles and access privileges. The portal shall support secure user authentication, role-based access control, and differentiated data visibility depending on the user category. Publicly available content shall be published in compliance with the applicable legal and regulatory framework, including data protection and confidentiality requirements. The Ministry shall determine the scope and level of data to be disclosed through the public interface.

## **1.7. Institutional Readiness and Change Management**

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The implementation of the IAIP represents an important step in the modernization and consolidation of the information systems used by MAFWE. By integrating multiple existing information systems and registries into a unified platform, the IAIP will introduce improvements in the way data is collected, processed, managed, and reported across several organizational units of the Ministry and its regional offices.

Recognizing that the introduction of a new integrated information platform may require adjustments in operational practices and user interaction with the system, the implementation approach shall include activities aimed at supporting institutional readiness and the transition from legacy systems to the IAIP environment.

### **1.7.1. Institutional Readiness Review**

At the beginning of the implementation phase, the Supplier shall perform an institutional readiness review of the operational environment relevant to the deployment of the IAIP. The purpose of this review shall be to support the effective introduction and adoption of the platform by identifying practical and organizational considerations related to the use of the system by different user groups within MAFWE.

The review shall cover operational aspects relevant to system implementation, including:

- The existing use of legacy systems covered by the IAIP scope;
- The categories of users interacting with the different modules of the platform;

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- The operational environment in which the system will be used, including headquarters and regional offices.

In addition, the review shall assess institutional readiness for the adoption and sustainable operation of the IAIP, including the alignment of existing operational practices with the platform’s functional scope, the capacity of users to effectively utilize the system, and potential risks that may affect the transition from legacy systems to the IAIP environment.

The outcome of this review shall be documented and submitted to the Purchaser as part of the inception phase deliverables. The findings shall be used as an input for refining the implementation planning, including the sequencing of module deployment and the organization of user training activities defined in Chapter 2.8.

The review is intended to support the practical and effective deployment of the IAIP platform and shall be proportionate to the scope of the Project, while ensuring that key institutional and operational risks are identified and appropriately addressed

### **1.7.2. Support to Operational Transition**

During the implementation of the IAIP, the Supplier shall support MAFWE in facilitating the transition from existing systems to the new integrated platform. Such support shall be implemented within the scope of system deployment, testing, and user training activities already foreseen under this Technical Specification.

Transition support shall be organized in a structured manner and aligned with the agreed implementation schedule, in order to ensure a controlled and gradual adoption of the IAIP platform across different user groups and organizational units.

In this context, transition support shall include:

- Phased deployment of system modules in accordance with the agreed implementation schedule;
- Testing of selected functionalities with representative user groups prior to wider operational rollout;
- Collection and consideration of user feedback during testing and early operational phases, with the objective of improving usability and supporting effective system adoption.

Where required, transition activities shall be coordinated with the continued operation of legacy systems in order to ensure continuity of critical business processes during the transition period. These activities shall be closely aligned with the testing procedures and training activities described in this Technical Specification and shall aim to ensure the smooth and effective operational adoption of the IAIP platform.

The Supplier shall ensure that the transition activities are properly documented as part of the implementation deliverables.

### **1.7.3. Institutional Governance of the Platform**

The long-term operation and evolution of the IAIP platform require appropriate institutional arrangements within MAFWE for its management and oversight.

MAFWE will designate the responsible organizational units and roles for the strategic oversight, operational management, and technical administration of the platform. These responsibilities may include, inter alia:

- Overall coordination, technical administration and system operation;
- Management of registries, codebooks, and business rules implemented within the platform;
- Coordination with external institutions involved in interoperability and data exchange.

- The detailed internal governance arrangements will be defined by MAFWE in accordance with the Ministry’s institutional framework.

In order to support the effective implementation of the IAIP platform, MAFWE shall ensure that institutional governance arrangements, including the designation of responsible organizational units and roles, are formally established prior to the commencement of Phase 2 (Core Systems Deployment).

These arrangements shall ensure that appropriate institutional counterparts are available to support implementation, testing, and operational transition activities, and their existence shall be considered a prerequisite for the initiation of Phase 2 activities.

The Supplier shall cooperate with the designated structures during the implementation, warranty, and post-warranty support periods, and shall align its activities with the defined institutional roles and responsibilities in order to ensure the proper operation and maintenance of the IAIP platform.

## C. TECHNICAL SPECIFICATIONS

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### 2.1. Presentation Format of Detailed Functional Requirements

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The presentation format of the detailed functional requirements of each module and its components is explained below using a standard template (Table 1).

**Table 1 – Presentation format of Functional Requirements**

<p><b>Description of module / component:</b></p> <p>A list of all key modules and components is presented to clarify the details of IAIP functional capabilities. Each module is marked in the following format (<b>XXX</b>)</p>
<p>Each component or subcomponent is described using the following format:</p> <p><b>Detailed functional requirements:</b></p> <p>Details of functional requirements are listed in the other tables. Each requirement is uniquely numbered (Format: XXX.TT.RR) and linked with relevant module.</p> <ul style="list-style-type: none"> <li>• XXX – module or requirement group code</li> <li>• TT – table number</li> <li>• RR – requirement number</li> </ul>
<p>All functional requirements are categorized as Mandatory (<b>M</b>), Preferable (<b>P</b>) or for Information only (<b>I</b>).</p>

The symbols M / P / I are used in all functional and technical requirements in this document to indicate the type of requirement with the following meanings:

- M** MANDATORY: The requirements that must be met. Any nonconformity to the Mandatory requirements may render the bid as non-responsive. The words MUST and SHALL have to be used interchangeably throughout the text and will represent MANDATORY requirement.

- P** PREFERABLE: The requirements that are very much wanted (and paid for, if funding allows) but which are not a cause for a bid to be considered as non-responsive. The words WOULD, SHOULD, MAY, CAN, COULD, shall be used interchangeably throughout the text and will represent PREFERABLE requirement.
- I** INFORMATIVE: These items are included together with the list of M / P requirements to inform the Bidder about something important/relevant and will not be considered during the evaluation of bids.

This structure applies to all IAIP modules, including registry management, user and security services, interoperability interfaces, data migration, the Business Intelligence (BI) platform, and hardware components. All bidders must follow this format when presenting their compliance with the functional and technical requirements, ensuring that each requirement is clearly referenced, addressed, and substantiated with appropriate documentation or technical descriptions.

## 2.2. General Technical Requirements

### General Technical Requirements

Number	Feature	Type
<b>GTR.01.01</b>	The IAIP must be created and developed as an integrated structure that meets the purpose of the information system, ensuring the integrity, interrelationship, and compatibility of all its components.	<b>M</b>
<b>GTR.01.02</b>	All IAIP components must be developed and implemented systematically to form an integrated system	<b>M</b>
<b>GTR.01.03</b>	The IAIP must be implemented as a web-based system, with a modular design to accommodate changing business needs	<b>M</b>
<b>GTR.01.04</b>	The language used in the IAIP must be Macedonian. All information technologies must provide support for multi-language use. Albanian and English languages MUST be supported.	<b>M</b>
<b>GTR.01.05</b>	The IAIP must ensure high-availability performance and scalable design	<b>M</b>
<b>GTR.01.06</b>	The IAIP must enforce integrity controls for both user-role based access control & security and for internal consistency.	<b>M</b>
<b>GTR.01.07</b>	The IAIP administrators must be able to add and change users and assign role-based security	<b>M</b>
<b>GTR.01.08</b>	All transactions made by IAIP administrators must be logged and available for reporting.	<b>M</b>
<b>GTR.01.09</b>	All transactions must be audited and available for reporting.	<b>M</b>
<b>GTR.01.10</b>	The IAIP must support data archiving mechanisms, ensuring long-term storage of historical data and the possibility to access archived records when required.	<b>M</b>
<b>GTR.01.11</b>	User rights management must be integrated with Active Directory Services.	<b>M</b>

<b>GTR.01.12</b>	System administrators must be able to assign rights to users and groups alike.	<b>M</b>
<b>GTR.01.13</b>	The IAIP must provide two levels of administrative roles: (a) system administrators and (b) module administrators.	<b>M</b>
<b>GTR.01.14</b>	The IAIP must have central directory services authentication supporting LDAP and Kerberos protocols integrated into the MAFWE's Active Directory (AD) services.	<b>M</b>
<b>GTR.01.15</b>	All servers must be joined to the MAFWE Active Directory domain and configured to use Kerberos authentication protocol.	<b>P</b>
<b>GTR.01.16</b>	Existing Active Directory security policies must be applicable to all servers.	<b>P</b>
<b>GTR.01.17</b>	<p>The IAIP must be developed in a way that ensures the flexibility of its technical infrastructure. Flexibility refers to the system's ability to adjust and modify its parameters according to the operating conditions and modes of its individual components and subsystems. The flexibility of the technical infrastructure is characterized by the following parameters:</p> <ul style="list-style-type: none"> <li>- Possibility for the upgrade of the existing equipment,</li> <li>- Possibility for automated update of system software versions on servers, workstations and network equipment,</li> <li>- Possibility for the authorized administrator to perform on-line control over the system software updates processes including start-up, shutdown, suspension, rollback to the previous conditions and restarting secure software (SSW) update processes of all IAIP components,</li> <li>- Possibility for the authorized administrator to receive on-line information on the status and level of availability and/or loading of all IAIP components (including system software availability and status).</li> </ul>	<b>M</b>
<b>GTR.01.18</b>	The IAIP should be configured to ensure scalability, i.e., the ability to expand computational resources and other necessary components by adding them to the existing infrastructure. It is desirable that additional components (physical hosts, processors, memory, disks) can be installed without interrupting system operations	<b>P</b>
<b>GTR.01.19</b>	The IAIP must be capable of enhancing its functionality by incorporating additional modules when needed, without requiring major re-engineering	<b>M</b>
<b>GTR.01.20</b>	The IAIP should enable access to selected system functionalities through mobile devices (OS: Windows, Android, iOS), in accordance with defined security and access control rules.	<b>M</b>
<b>GTR.01.21</b>	The IAIP must provide reporting functionalities that enable generation of standard and custom reports based on system data, including contractual, financial, and operational information.	<b>M</b>
<b>GTR.01.22</b>	The IAIP must provide standardized web services (REST/SOAP APIs) fully compliant with the National Interoperability Platform	<b>M</b>

	standards, ensuring secure, standardized, and traceable data exchange with other public sector systems.	
<b>GTR.01.23</b>	The IAIP must include mechanisms for monitoring, logging, and error handling throughout ETL and data migration processes.	<b>M</b>
<b>GTR.01.24</b>	All IAIP components should be developed using a secure version control and configuration management system (e.g., Git), with CI/CD pipelines that support automated deployment, rollback to previous stable versions, and segregation of environments (development, testing, production)	<b>P M</b>
<b>GTR.01.25</b>	The IAIP must be designed and implemented in compliance with applicable national legislation and regulatory requirements.	<b>M</b>
<b>GTR.01.26</b>	The IAIP must provide a public web portal that enables open access to selected datasets originating from selected registers, databases, and information resources managed within the IAIP platform, in accordance with applicable legislation and data access policies defined by MAFWE.	<b>M</b>
<b>GTR.01.27</b>	The public portal must allow users to browse, search, and view datasets of public interest, including aggregated statistical data, geospatial information, reports, and other information designated for public access.	<b>M</b>
<b>GTR.01.28</b>	The IAIP must provide mechanisms for publishing selected datasets through interactive dashboards, maps, tables, and downloadable formats, ensuring transparency and accessibility of agricultural information of public interest.	<b>M</b>
<b>GTR.01.29</b>	The IAIP must include configurable mechanisms that allow authorized administrators to define which datasets, registers, or attributes can be publicly accessible, ensuring that restricted, personal, or confidential information is not exposed.	<b>M</b>
<b>GTR.01.30</b>	The public access functionalities should support standardized open data formats and services (e.g., CSV, JSON, XML, and geospatial services such as WMS/WFS where applicable) to facilitate reuse of publicly available data by citizens, institutions, and third parties.	<b>M</b>

## 2.3. ICT Infrastructure Environment

The IAIP solution shall be deployed and configured to operate on the existing ICT infrastructure provided by MAFWE. The Ministry has already secured enterprise-grade servers, centralized data storage, and a virtualization platform based on VMware, which together provide a reliable and production-ready environment for hosting the IAIP.

Within the framework of this project, the ICT infrastructure shall be upgraded with 2 (two) additional Host Servers, which must be fully integrated into the existing VMware-based virtualization environment operated by MAFWE.

Detailed technical information related to the existing virtualization environment, including cluster configuration, storage architecture, networking setup, and operational policies, shall be made available to the Supplier with the most economically advantageous tender during the contract implementation phase, in accordance with MAFWE's internal security and information disclosure procedures.

MAFWE will also provide all required Microsoft Operating System licenses for the virtual machines used to host IAIP components, including test, staging, and production environments.

If the Supplier requires any additional operating system licenses that are not already available at MAFWE (e.g., commercial Linux distributions), the Supplier shall provide these licenses and include the associated costs in the financial proposal, as MAFWE does not have a budget allocated for procuring additional OS licenses.

The virtualization platform enables cost-effective use of hardware resources, hardware independence, and simplified expansion by adding additional hosts in the future. High Availability (HA) is ensured through fault-tolerant configuration, shared storage, and failover mechanisms that guarantee business continuity of the IAIP.

All data collected and processed by the IAIP will be stored in centralized databases within the virtualized environment. The IAIP will use robust relational database technology suitable for complex, mission-critical systems, while selected datasets will feed into a central data warehouse serving as the analytical environment for reporting, business intelligence, and monitoring and evaluation (M&E).

To ensure a secure and isolated deployment, the IAIP production environment will be hosted on the existing MAFWE data center infrastructure, supported by redundant power supply and network connectivity. The Supplier shall provide clear deployment documentation describing the system architecture, resource allocation, and configuration.

In addition to the existing infrastructure, the Project foresees the procurement of next-generation firewall devices that will protect the IAIP servers and storage both from internal LAN traffic and from communication originating through the National Interoperability Platform. The Supplier shall deliver, install, and configure the firewall devices, including all necessary security licenses and subscriptions for updates and support during the period of 2 (two) years.

The Supplier shall be responsible for:

- Ensuring full compatibility of all IAIP software components with the existing virtualization and storage environment;
- Delivering and configuring the IAIP in line with high-availability and business continuity requirements (clustering, failover, redundancy);
- Providing deployment documentation describing the system architecture, resource allocation, and configuration;
- Delivering, configuring, and integrating the two additional host servers into the existing virtual environment, including their setup, configuration, and clustering for high availability;
- Delivering, configuring, and integrating the firewall devices into the existing infrastructure, including the definition of access control, VPN, and intrusion prevention policies to secure IAIP communication;

- Proposing and justifying any additional ICT components only if strictly required for the secure and stable operation of the IAIP.

All procured or proposed additional components must be fully integrated into the existing infrastructure without duplicating capacities already available at MAFWE.

The Supplier’s responsibilities therefore include the installation, configuration, optimization, and integration of the delivered hardware and software, as well as ensuring its secure and reliable operation within the provided infrastructure, complemented by the servers and firewall devices procured under this Project.

### 2.3.1. Firewalls

To ensure the protection of the IAIP infrastructure, two next-generation firewalls (NGFW) shall be procured, installed, and configured as part of the Project.

The firewalls will have the role of protecting the IAIP servers and storage from both internal (LAN) and external traffic, including data exchange with the National Interoperability Platform and other integrated systems.

The firewalls must be deployed in **high-availability (HA) active/standby mode** and managed through a **centralized management console** (on-premises or cloud-based), allowing MAFWE’s IT administrators to monitor security events, configure rules, and manage updates.

The Supplier shall provide Manufacturer Authorization Form (MAF) for the offered firewall equipment. The Supplier shall deliver, install, and configure the firewall devices, including all required licenses and subscriptions for security updates, VPN functionality, intrusion prevention, and vendor support. The Supplier shall also prepare detailed documentation describing the configuration, security policies, and operational procedures for ongoing administration and monitoring.

#### Firewalls Detailed Requirements

Number	Feature	Type
<b>ICT.01.01</b>	Firewalls with following minimal technical requirements: <ul style="list-style-type: none"> <li>• The proposed firewall solution must be deployable as an active/standby cluster (two firewall in the cluster).</li> <li>• The proposed firewall solution must have the ability to be managed from a central console in the cloud.</li> <li>• The proposed firewall solution should report events to the IT management system. Faults and anomalies should be communicated by means of SNMP traps and email</li> <li>• The proposed firewall shall act as a VPN concentrator and support crypto-based access security, with min 2,700 IPsec VPN concurrent IKE peers and minimum 4 Gbps IPsec VPN performance measured with 64KB HTTP transactions and logging enable.</li> </ul>	<b>M</b>

	<ul style="list-style-type: none"> <li>● The firewall must support network-layer deep packet inspections to protect the network against viruses, trojans, malware, hacker attacks, etc.</li> <li>● The proposed firewall solution must at least provide the following performances: <ul style="list-style-type: none"> <li>✓ The firewall throughput performance: min 8 Gbps (for application recognition and control - for 64 KB transactions)</li> <li>✓ The performance on IPS: minimum 4 Gbps throughput, measured with App-ID, IPS, antivirus, antispysware, Sandboxing, DNS Security, file blocking, and logging enabled, utilizing mixed applications profile transactions. Additionally, because of scalable needs, the proposed solution must be capable of enabling any new security service, through an existing or purchased license, without impacting the required and mentioned performance.</li> <li>✓ The firewall must be designed to support at least 900,000 concurrent sessions.</li> <li>✓ The firewall must support at least 90,000 new connections/sec.</li> <li>✓ The firewall must provide next-gen advanced protection from all types of modern attacks.</li> <li>✓ The firewall system must be able see beyond the packet and provide contextual threat analysis and protection by correlating full-stack endpoint visibility with applications, OS, vulnerabilities, device info, users associated with security events.</li> <li>✓ The offered firewall device must automatically identify applications, regardless of port numbers (including P2P and IM type applications). Recognition must be identified at least through a signature, i.e. adequate application signatures. The device must have support for at least 5000 predefined applications supported by the manufacturer, including application tunneling in HTTP or HTTPS.</li> <li>✓ The proposed firewall solution must be able to provide a machine learning algorithm for advanced protection directly within the platform, without the need for external connections.</li> <li>✓ The firewall must have at least: <ul style="list-style-type: none"> <li>■ Min 8 x 1 Gbps RJ45 Interfaces</li> <li>■ Min 4 x 1/2.5/5 Gbps RJ45 Interfaces</li> <li>■ Min 4 x 1 Gbps SFP Interfaces,</li> <li>■ Min 4 x 1/10 Gbps SFP/SFP+ Interfaces (SFP+ up to 10 Gbps)</li> <li>■ Min 1 x 1 Gbps Management RJ45 Interfaces</li> <li>■ Min 2 x 1 Gbps dedicated HA RJ45 Interfaces</li> <li>■ 1 x Console Port and 1 x USB Port</li> </ul> </li> <li>✓ Performance Test Methodology according to manufacturer's official documentation.</li> </ul> </li> </ul>	
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	<p>✓ The proposed firewall must include a 2-year license, maintenance, and support package warranty period of two (2) years, starting from the date of Final System Acceptance Report.</p>	
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### 2.3.2. Servers

The envisaged host servers shall be deployed as an integral part of the Ministry of Agriculture, Forestry and Water Economy’s (MAFWE) existing virtualized server cluster, with the objective of increasing the overall computing capacity, performance, and resilience of the current infrastructure. The servers are not intended to operate as a standalone environment, but rather to extend and reinforce the Ministry’s existing virtualization platform, ensuring seamless integration and full compatibility with the currently deployed hardware and software components.

The proposed server infrastructure is intended to support the long-term operational, analytical, and spatial data processing needs of the IAIP within MAFWE’s existing virtualized infrastructure. In addition to providing sufficient capacity for transactional workloads, registry management, GIS services, and the Business Intelligence (BI) platform, the server configuration shall ensure scalability for future functional extensions of the platform.

The inclusion of GPU capabilities is foreseen to enable advanced geospatial processing, spatial analytics, and performance-intensive GIS operations, as well as to support potential future use cases such as AI-assisted data validation, machine learning-based analytics, automation of quality control processes, and advanced analytical services. These capabilities are included as a strategic measure to ensure future readiness of the IAIP and to avoid additional hardware upgrades during the system’s operational lifecycle.

The envisaged server configuration shall be fully compatible with the existing VMware virtualization environment at MAFWE and shall be deployed as part of the high-availability cluster, in line with the Ministry’s infrastructure, security, and business continuity policies. To ensure full vendor support, warranty validity, and compliance with manufacturer best practices, the Supplier shall provide a valid Manufacturer Authorization Form (MAF) issued by the original equipment manufacturer for the proposed server equipment.

#### Detailed Server Requirements

Number	Feature	Type
ICT.02.01	<ul style="list-style-type: none"> <li>• Servers – QTY: 2</li> <li>• Minimum requirements per system:</li> <li>• Rack-mountable server, expandable to up to 3 single-wide GPUs via PCIe 5.0 slots. Minimum 2 additional PCIe 5.0 slots are required.</li> <li>• Minimum 2 CPUs, each with at least 16 cores, 2.3 GHz base frequency, 72 MB cache, 150W TDP, latest generation or equivalent.</li> <li>• Minimum 1024 GB DDR5 6400 MHz RDIMM memory, expandable to 8 TB, with at least 32 DIMM slots.</li> <li>• Support for ECC, SDDC, ADDDC, memory mirroring, bounded fault detection/correction.</li> <li>• Minimum 2 × 960 GB NVMe PCIe 4.0 SSDs with dedicated RAID controller.</li> <li>• Connectivity:</li> <li>• 1 × dual-port 10/25 GbE SFP28 2-port Ethernet adapter</li> <li>• 1 × dual-port 32 Gb Fibre Channel adapter</li> <li>• Ports:</li> <li>• Front: diagnostic port, Mini DisplayPort 1.1a or equivalent</li> <li>• Rear: 2 × USB 3, RJ-45, VGA, optional serial port</li> <li>• Internal: USB 3.1 for security token</li> <li>• Dedicated GPU with Generative AI capabilities:</li> <li>• ≥24 GB GDDR6</li> <li>• ≥300 GB/s bandwidth</li> <li>• ≤72 W power consumption</li> <li>• PCIe Gen4 x16</li> <li>• ≥256 VFs (virtual functions)</li> <li>• Peak FP16 Tensor up to 121 TFLOPS (242 TFLOPS sparse)</li> <li>• Hardware AV1 encode/decode supporting up to 1040 concurrent 720p30 streams</li> <li>• Integrated management controller with dedicated Gigabit port supporting IPMI 2.0, Web GUI, SSH, remote media mounting, SNMP, crash capture, mobile access, and multi-user console.</li> <li>• Power: 2 × 1300 W Titanium hot-swap power supplies.</li> <li>• Security: chassis intrusion switch, TPM 2.0, Root of Trust, PFR, FIPS 140-3, CNSA, NIST 800-193 compliance or equivalent.</li> <li>• The proposed Servers must include maintenance and support package during the warranty period of two (2) years, starting from the date of Final System Acceptance Report.</li> </ul>	M

## 2.4. Standard Software Specifications

### 2.4.1. Database Server (RDBMS)

The Database Server (RDBMS) will represent the backbone of the Integrated Agricultural Information Platform (IAIP), ensuring secure, efficient, and scalable storage and processing of all registry and transactional data managed by the Ministry of Agriculture, Forestry and Water Economy (MAFWE). The RDBMS must support enterprise-level workloads and provide the reliability and performance required for mission-critical operations.

In addition to standard relational data management, the RDBMS must support spatial data storage and querying in compliance with OGC standards, enabling the IAIP to natively manage and process geospatial information relevant for agricultural registries and monitoring activities. This ensures that registries containing land parcels, livestock distributions, or environmental zones can be seamlessly integrated into the IAIP without requiring external data transformations.

The RDBMS must also be tightly integrated with the Business Intelligence (BI) platform and data warehouse, serving as the primary source of high-quality, structured, and semi-structured data for analytics and reporting. Features such as OLAP support, data mining, in-database analytics, and machine learning services must be available to enable advanced evidence-based policy analysis.

To guarantee continuity of operations, the RDBMS must provide high availability, disaster recovery, and robust replication mechanisms, ensuring uninterrupted services and data integrity. Strong security features—including encryption, row-level security, and auditing—must be enforced to protect sensitive agricultural data in compliance with national information security standards.

Finally, the proposed solution must remain technologically neutral. Both commercial (licensed) and Free open-source RDBMS platforms may be proposed, provided that they meet the mandatory functional, performance, and security requirements defined herein.

#### Database Server (RDBMS) Detailed Requirements

Number	Feature	Type
<b>SSS.01.01</b>	The IAIP platform and all its applications must use a centrally located Database Management System (DBMS).	<b>M</b>
<b>SSS.01.02</b>	The RDBMS could be based on using Free Open-Source Software (FOSS) or based on Commercial of The Shelf Software (COTS). In any case, a justification of the proposed solution must be provided in term of costs and benefits.	<b>I</b>
<b>SSS.01.03</b>	The RDBMS should deliver comprehensive high-end datacenter capabilities, fast performance, and end-to-end business intelligence, enabling high service levels for mission-critical workloads.	<b>M</b>
<b>SSS.01.04</b>	The RDBMS must include at least the following features: - Core services providing secure data storage and processing, replication, full-text search, management of relational and XML	<b>M</b>

	<p>data, database analytics integration, access to external heterogeneous data sources, and machine learning services for executing Python and R scripts on relational data</p> <ul style="list-style-type: none"> <li>- Tools for creating and managing online analytical processing (OLAP) and data mining applications.</li> <li>- Server and client components for creating, managing, and deploying tabular, matrix, graphical, and free-form reports.</li> <li>- Graphical tools and programmable objects for moving, copying, and transforming data.</li> <li>- Supports distributed, scalable machine learning solutions using enterprise data sources.</li> <li>- Query different types of data on different types of data sources.</li> <li>- Shall provide add, delete, edit, search, and sort options for records in the selected databases.</li> </ul>	
<b>SSS.01.05</b>	<p>The offered RDBMS solution should have the following performance limits:</p> <ul style="list-style-type: none"> <li>- The maximum compute capacity used by a single instance limited only by the operating system maximums.</li> <li>- The maximum memory for buffer pool per instance limited only by the operating system maximums.</li> <li>- The maximum memory for column store segment cache per instance limited only by the operating system maximums.</li> <li>- The maximum memory-optimized data size per database should be unlimited.</li> <li>- The maximum supported relational database size must be sufficient to accommodate future growth of IAIP data, with no hard-coded limitations below petabyte-scale. The offered RDBMS must ensure scalability aligned with enterprise-grade deployments.</li> <li>- Web browser-based administration console for administration, maintenance, backup and recovery, monitoring, and performance tuning.</li> </ul>	<b>P</b>
<b>SSS.01.06</b>	<p>The RDBMS must support concurrent multi-user access and must not impose hard-coded limitations on the number of connected users.</p>	<b>M</b>
<b>SSS.01.07</b>	<p>The RDBMS shall operate without interruption in the event of single-component hardware failure. High-availability (HA), fault-tolerance, and disaster-recovery (DR) capabilities shall be ensured at the infrastructure layer through the existing virtualization and server platform provided by MAFWE.</p> <p>At the database layer, the system shall support a configuration with one primary (write) database instance and one read-only replica, with the following minimum capabilities:</p> <p><b>Database Read/Write Architecture</b></p>	<b>M</b>

	<p>A single primary database instance for all write operations.</p> <p>A single read-only replica for reporting, analytics, and ad-hoc queries.</p> <p>Read routing to replica for non-transactional operations.</p> <p>Consistent replication between primary and replicas (synchronous or asynchronous, depending on the use case).</p> <p><b>Failover &amp; Resilience</b></p> <p>Automatic reconnection of clients in case of infrastructure-level failover.</p> <p>Support for restoration of database services without requiring user reconnection.</p>	
SSS.01.08	<p>The RDBMS must ensure full protection of all stored data through industry-standard security, encryption, and auditing mechanisms. At minimum, the system must support:</p> <p><b>Access Control &amp; Data Protection</b></p> <p>Fine-grained or row-level access control.</p> <p>Field/column encryption for sensitive data.</p> <p>Dynamic or policy-based data masking.</p> <p><b>Encryption</b></p> <p>Transparent encryption of data at rest (databases, logs, temp files).</p> <p>Encrypted backups.</p> <p>Integration with external or pluggable key-management systems (KMS).</p> <p><b>Auditing &amp; Compliance</b></p> <p>Server-level and database-level auditing of user actions and security events.</p> <p>Data-classification capabilities with audit logging.</p> <p>Export of audit logs to external security or SIEM systems.</p> <p>Monitoring and analysis of SQL statements execution to detect, diagnose, and proactively tune database performance.</p> <p><b>Identity &amp; Role Management</b></p> <p>Custom user-defined roles and granular privilege management.</p> <p>Isolation mechanisms for secure database boundaries (e.g., contained or schema-isolated databases).</p> <p><b>Secure Execution &amp; Operations</b></p> <p>Support for secure execution environments for sensitive operations where available (e.g., enclaves or trusted execution).</p> <p>Enforced encrypted connections (TLS) for all client communications.</p>	M
SSS.01.09	<p>The RDMS should support at least the following data warehouse features:</p> <ul style="list-style-type: none"> <li>- Auto-generate staging and data warehouse schema,</li> <li>- Change data capture,</li> </ul>	P

	<ul style="list-style-type: none"> <li>- Star join query optimizations,</li> <li>- Parallel query processing on partitioned tables and indexes,</li> <li>- Global batch aggregation.</li> </ul>	
<b>SSS.01.10</b>	<p>The RDBMS solution should support at least the following analytical services:</p> <ul style="list-style-type: none"> <li>- both multidimensional and tabular models, allowing users to choose the modeling approach that best fits their analytical needs,</li> <li>- provides data mining algorithms that enable discovery of hidden patterns, trends, and insights in the data,</li> <li>- integration with advanced analytics tools and languages, such as R and Python, to incorporate predictive analytics and machine learning into the analysis,</li> <li>- efficient data storage and retrieval through features like partitioning and aggregation, optimizing performance for large datasets,</li> <li>- granular security controls, allowing administrators to define roles and permissions at different levels to control access to data and analytical models,</li> <li>- ability to define and track KPIs to monitor and analyze business performance against predefined targets,</li> <li>- Tools and features for performance monitoring, optimization, and tuning of the data models,</li> <li>- utilization of parallel processing capabilities to enhance the performance of query processing and data retrieval,</li> <li>- support for a variety of data sources, including relational databases, data warehouses, and other data storage systems,</li> <li>- support for features such as row-level security, bi-directional cross-filtering, and improved data analysis expressions functions if using tabular model.</li> </ul>	<b>P</b>
<b>SSS.01.11</b>	The RDBMS must support spatial data storage and querying in compliance with OGC standards (geometry, geography, raster types), enabling spatial indexing and spatial joins within the database.	<b>M</b>
<b>SSS.01.12</b>	The RDBMS must provide seamless integration with the BI platform, including direct connectors and optimized drivers for reporting and visualization tools.	<b>M</b>
<b>SSS.01.13</b>	Warranty and support for required licenses for the RDBMS during a warranty period of two (2) years, starting from the date of Final System Acceptance Report.	<b>M</b>

## 2.4.2. GIS Platform

### 2.4.2.1. GIS Server Platform

The GIS platform will serve as the core infrastructure for managing, analyzing, and visualizing spatial data related to SALMIS, LPIS, and other domain-specific datasets containing geospatial information. These include the Farm Register, Organic Production Register, Register of Food

Operators, among others. By providing centralized management and dissemination of spatial data, the GIS Server Platform ensures that geographic information is consistently integrated into MAFWE’s registries and business processes.

The platform will enable secure publishing and consumption of GIS web services, supporting spatial analysis, visualization, and geoprocessing functions required for policy implementation and monitoring. It will provide role-based access and multiuser editing, ensuring that spatial data can be collaboratively maintained without compromising integrity or security.

The GIS Server Platform shall comply with Open Geospatial Consortium (OGC) standards and the EU INSPIRE Directive (2007/2/EC), ensuring interoperability with both national and European spatial data infrastructures. This includes support for standardized services (e.g., WMS, WFS, WCS, WMTS), metadata management (ISO 19115/19139), and INSPIRE data models for cadastral parcels, land cover, land use, and agricultural/environmental zones.

Spatial data must be managed using the official Macedonian national coordinate reference system EPSG:6316, while also supporting international standards such as WGS84 and other coordinate systems required for interoperability.

The GIS Server Platform will support integration with multiple database technologies (MS SQL Server, Oracle, PostgreSQL/PostGIS), ensuring flexibility in handling existing and future spatial datasets. It will also provide compatibility with mobile GIS applications, allowing field data collection and validation when required.

By deploying the GIS Server Platform, the IAIP shall ensure high-quality, standards-compliant spatial data management, strengthen registries with geospatial components, and align North Macedonia’s agricultural data systems with INSPIRE and NSDI requirements.”

### GIS Server Platform Detailed Requirements

Number	Feature	Type
SSS.02.01	The GIS server could be based on using Free Open-Source Software (FOSS) or based on Commercial of The Shelf Software (COTS). In any case, a justification of the proposed solution must be provided in term of costs and benefits.	I
SSS.02.02	The GIS server software must allow flexible deployment: complete on-premises – connected or disconnected from the open Internet, on physical hardware or virtualized environments	M
SSS.02.03	The GIS server software must allow work with GIS Web Services.	M
SSS.02.04	The GIS server software must allow work with Web Mapping Applications.	M
SSS.02.05	The GIS server software must enable Web editing of spatial data	M
SSS.02.06	The GIS server software must support performing analytical functions in Web environment	M
SSS.02.07	The GIS server software should support performing of big data analysis	P

<b>SSS.02.08</b>	The GIS server software must support mobile GIS applications, including development tools for field data collection and validation.	<b>M</b>
<b>SSS.02.09</b>	The GIS server software must support the processing of cached and dynamic raster data	<b>M</b>
<b>SSS.02.10</b>	The GIS server software must support geoprocessing	<b>M</b>
<b>SSS.02.11</b>	The GIS platform shall be architected to support at least 200 concurrent users, with scalability mechanisms that allow the system to accommodate increasing numbers of simultaneous users as operational needs grow.	<b>M</b>
<b>SSS.02.12</b>	The GIS server software must support secured access to GIS Web resources for users enabled to only view published services	<b>M</b>
<b>SSS.02.13</b>	The GIS server software must support secured sharing of services	<b>M</b>
<b>SSS.02.14</b>	The GIS server software must support Feature Classes	<b>M</b>
<b>SSS.02.15</b>	The GIS server software must support attribute tables	<b>M</b>
<b>SSS.02.16</b>	The GIS server software must support rasters	<b>M</b>
<b>SSS.02.17</b>	The GIS server software must support Vector Tile Maps and Layers	<b>M</b>
<b>SSS.02.18</b>	The GIS server software must support topology	<b>M</b>
<b>SSS.02.19</b>	The GIS server software must support multiuser editing in accordance with the levels of authority	<b>M</b>
<b>SSS.02.20</b>	The GIS server software must support the most popular web browsers (Google Chrome, Mozilla Firefox, Edge, etc.) in their latest stable versions.	<b>M</b>
<b>SSS.02.21</b>	The GIS server software must work with spatial data using the Open GIS Consortium (OGC) standards	<b>M</b>
<b>SSS.02.22</b>	GIS Web services must support REST, SOAP and OGC standards	<b>M</b>
<b>SSS.02.23</b>	The GIS server software must support: <ul style="list-style-type: none"> <li>– WMS Web services</li> <li>– WFS Web services</li> <li>– WCS Web services</li> <li>– WMTS Web services</li> <li>– Geodata Web services</li> <li>– Geocode Web services</li> <li>– Geometry Web services</li> <li>– Geoprocessing Web services</li> <li>– Image Web services</li> <li>– KML Web services</li> </ul>	<b>M</b>
<b>SSS.02.24</b>	The GIS server software must support: <ul style="list-style-type: none"> <li>– MS SQL Express database</li> <li>– MS SQL Server database</li> <li>– Oracle database</li> <li>– PostgreSQL database</li> </ul>	<b>M</b>

<b>SSS.02.25</b>	The GIS server software must allow input, processing and search of metadata	<b>M</b>
<b>SSS.02.26</b>	The GIS server software must support projections and coordinate systems, including EPSG:6316 (Macedonian national CRS), WGS84, and other widely used CRSs.	<b>M</b>
<b>SSS.02.27</b>	The GIS server software must comply with the INSPIRE Directive (2007/2/EC) and its implementing rules	<b>M</b>
<b>SSS.02.28</b>	The GIS server software should provide support for INSPIRE Data Themes, ensuring compatibility with environmental and land management datasets	<b>M</b>
<b>SSS.02.29</b>	The GIS server software should provide support for INSPIRE Metadata (ISO 19115, ISO 19119, ISO 19139) to describe datasets, services, and applications	<b>M</b>
<b>SSS.02.30</b>	The GIS server software should provide tools for metadata validation against INSPIRE metadata schema	<b>M</b>
<b>SSS.02.31</b>	The GIS server software should provide support for INSPIRE Data Models and schema transformation for: <ul style="list-style-type: none"> <li>– Cadastral Parcels</li> <li>– Land Cover &amp; Land Use</li> <li>– Agricultural and Environmental Zones</li> </ul>	<b>M</b>
<b>SSS.02.32</b>	The GIS server software should provide support for INSPIRE Data Specifications, ensuring: <ul style="list-style-type: none"> <li>– Feature-based data storage</li> <li>– Compliance with defined coordinate reference systems (e.g., ETRS89, WGS84)</li> </ul>	<b>M</b>
<b>SSS.02.33</b>	The GIS server software must support the following INSPIRE interoperable network services: <ul style="list-style-type: none"> <li>– Discovery Service (CSW - Catalogue Service for the Web)</li> <li>– View Service (WMS, WMTS)</li> <li>– Download Service (WFS, ATOM, WCS)</li> <li>– Transformation Service</li> <li>– Invoke Spatial Data Services (WPS)</li> </ul>	<b>M</b>
<b>SSS.02.34</b>	The Supplier is encouraged to propose additional GIS extensions or modules (e.g., 3D visualization, terrain analysis, or spatial statistics) that can enhance the analytical capabilities of the IAIP.	<b>I</b>
<b>SSS.02.35</b>	The proposed GIS server software must include a 2-year license with maintenance and support during a warranty period of two (2) years, starting from the date of Final System Acceptance Report.	<b>M</b>

#### **2.4.2.2. GIS Desktop Software**

The Desktop GIS software represents a critical component of the Integrated Agricultural Information Platform (IAIP) by enabling advanced spatial data management, editing, and analysis. While the GIS server platform provides centralized storage, processing, and

dissemination of geospatial services, the desktop client is essential for day-to-day operations such as data preparation, validation, and quality control.

The Desktop GIS application will allow MAFWE staff and authorized users to create, edit, and analyze spatial datasets across various registries and information modules that include a geospatial component. This includes the ability to integrate tabular and spatial data, perform topology checks, validate geometries, and ensure compliance with INSPIRE and national standards.

The software will support the Macedonian national coordinate reference system (EPSG:6316) while also enabling transformation into international reference systems (WGS84, ETRS89), thus ensuring compatibility with external datasets and European Union requirements.

Through direct integration with the GIS server platform, the desktop client will maintain consistency of data across the IAIP environment. It will also allow users to consume OGC-compliant web services (WMS, WFS, WMTS, WCS) and to publish validated datasets and cartographic products back to the centralized environment.

In addition, the Desktop GIS software will provide tools for cartographic visualization, thematic mapping, metadata management, and reporting, ensuring that spatial information can be efficiently transformed into actionable knowledge for evidence-based policymaking and monitoring.

### GIS Desktop Software Detailed Requirements

Number	Feature	Type
SSS.03.01	The Desktop GIS client could be based on using Free Open-Source Software (FOSS) or based on Commercial of The Shelf Software (COTS). In any case, a justification of the proposed solution must be provided in term of costs and benefits.	I
SSS.03.02	The Desktop GIS client (the application) must work seamlessly with the GIS server platform for retrieval, editing, and publishing of spatial data.	M
SSS.03.03	The application must provide tools for browsing, organizing, and managing GIS databases and datasets.	M
SSS.03.04	The application must support standard map navigation and allow: <ul style="list-style-type: none"> <li>- pan and zoom the map;</li> <li>- zoom to the full study area of the map;</li> <li>- zoom to the extent of a layer;</li> <li>- zoom to the visible scale of a layer;</li> <li>- zoom to a specific map scale.</li> </ul>	M
SSS.03.05	The application must allow feature identification, attribute inspection, and hyperlink access.	M
SSS.03.06	The application must provide interactive measurement tools for distances and areas.	M

<b>SSS.03.07</b>	The application must allow to find an X, Y (Latitude-Longitude) location on a map.	<b>M</b>
<b>SSS.03.08</b>	The application must support selection of data by location and by attributes, with SQL query support.	<b>M</b>
<b>SSS.03.09</b>	The application must allow filtering features using a SQL query.	<b>M</b>
<b>SSS.03.10</b>	The application must support attribute editing, validation, and updating of records.	<b>M</b>
<b>SSS.03.11</b>	The application must support creating and managing legends, symbology, transparency, and labeling of map layers.	<b>M</b>
<b>SSS.03.12</b>	The application must support dynamic joins and relates between tables, including on-the-fly queries.	<b>M</b>
<b>SSS.03.13</b>	The application must allow viewing properties of joins and relates from table properties.	<b>M</b>
<b>SSS.03.14</b>	The application must support raster and vector data, including catalogs for large raster datasets.	<b>M</b>
<b>SSS.03.15</b>	The application must enable cartographic map production, including printing, plotting, and export to standard formats (PDF, TIFF, etc.).	<b>M</b>
<b>SSS.03.16</b>	The application must allow preparing and publishing high-quality map services (dynamic and cached) through integration with the GIS Server Platform.	<b>M</b>
<b>SSS.03.17</b>	The application must support publishing and sharing spatial datasets and maps to the GIS server platform.	<b>M</b>
<b>SSS.03.18</b>	The application must support direct reading of vector and raster data.	<b>M</b>
<b>SSS.03.19</b>	The application must support direct editing of vector Data.	<b>M</b>
<b>SSS.03.20</b>	The application must fully support CAD file formats (DXF, DWG, DGN), including import, export, and mapping specifications for bidirectional GIS–CAD data exchange.	<b>P</b>
<b>SSS.03.21</b>	The application must support direct reading of CAD data.	<b>M</b>
<b>SSS.03.22</b>	The application must support attribute validation.	<b>M</b>
<b>SSS.03.23</b>	The application must support geometry validation and quality assurance tools (topology checks, duplicate geometries, overlaps, gaps).	<b>M</b>
<b>SSS.03.24</b>	The application must support metadata.	<b>M</b>
<b>SSS.03.25</b>	The application must provide explicit support for archiving of edits in multiuser geodatabases, ensuring historical tracking and data integrity.	<b>M</b>
<b>SSS.03.26</b>	The application must support publishing and visualization of both 2D maps and vector tile layers.	<b>M</b>

<b>SSS.03.27</b>	The application must consume OGC-compliant services (WMS, WMTS, WFS, WCS) and INSPIRE-compliant datasets.	<b>M</b>
<b>SSS.03.28</b>	The application must support the Macedonian national coordinate reference system (EPSG:6316) and provide transformation to/from other systems (ETRS89, WGS84).	<b>M</b>
<b>SSS.03.29</b>	The application must explicitly support the European Terrestrial Reference System (ETRS89), including EPSG:4258 and EPSG:3035, in addition to WGS84 and national coordinate reference systems.	<b>M</b>
<b>SSS.03.30</b>	The application must be able to convert between local/national coordinate systems and INSPIRE reference systems	<b>M</b>
<b>SSS.03.31</b>	The application must support searching and locating features in the map based on attribute values and spatial criteria.	<b>M</b>
<b>SSS.03.32</b>	The application must provide advanced geometry quality assurance tools, including detection of duplicate geometries, overlapping features, and gaps.	<b>M</b>
<b>SSS.03.33</b>	The application must support explicit management of raster data catalogs, enabling efficient organization, browsing, and handling of large raster datasets.	<b>M</b>
<b>SSS.03.34</b>	The application must support the creation and publishing of cached map services through integration with the GIS Server Platform.	<b>M</b>

#### **2.4.2.2.1. Advanced 3D and Raster Analytical Functions**

The Desktop GIS environment will be used not only for visualization and editing of spatial data, but also for performing advanced analytical operations that support decision-making within the IAIP.

In particular, the LPIS and SALMIS modules and related land management components require tools for three-dimensional (3D) visualization and surface analysis to enable accurate spatial calculations, such as:

- determination of parcel boundaries and area through polygon intersection,
- slope and elevation analysis based on digital terrain models (DTMs), and
- estimation of cut/fill volumes for surface modification and terrain assessment.

To support these use cases, the GIS software must include integrated 3D and raster (grid) analytical functions allowing users to visualize, measure, and analyze spatial phenomena in both two and three-dimensional environments.

The following minimum requirements apply:

#### 2.4.2.2.1.1. 3D Visualization and Terrain Analysis

##### 3D Visualization and Terrain Analysis Detailed Requirements

Number	Feature	Type
SSS.04.01	The software shall support creation of 3D terrain and surface models directly from GIS data layers (e.g., contours, elevation points, or raster DEM).	M
SSS.04.02	The software shall enable 3D analysis including line-of-sight, cut-and-fill, and terrain modelling.	M
SSS.04.03	The software shall support visualization of geospatial data from global to local perspective with smooth navigation across multiple resolutions.	M
SSS.04.04	The software shall support spatial analysis in two or three dimensions (2D/3D).	M
SSS.04.05	The software shall enable visualization of analysis results in 3D, including thematic overlays and analytical layers.	M
SSS.04.06	The software should support export of 3D visualization results into standard video formats (e.g., MPEG, AVI, or equivalent).	P
SSS.04.07	The software shall provide integrated workflows for editing spatial data using GPS devices and associated GPS editing software.	M

#### 2.4.2.2.1.2. Raster (Grid) Surface Analysis

##### Raster (Grid) Surface Analysis Detailed Requirements

Number	Feature	Type
SSS.05.01	The software shall support interpolation of Z-values based on surface data.	M
SSS.05.02	The software shall support generation of 3D line-of-sight profiles as feature classes.	M
SSS.05.03	The software shall support calculation of line length in 3D space.	M
SSS.05.04	The software shall support calculation of elevation for a given point based on surface data.	M
SSS.05.05	The software shall support calculation of volume for a defined plane within a specified surface.	M
SSS.05.06	The software shall support surface interpolation using methods such as IDW, Kriging, Nearest Neighbour, Spline, or equivalent.	M
SSS.05.07	The software should support interpolation of surfaces using trend analysis techniques.	P

<b>SSS.05.08</b>	The software shall support raster algebra operations, including addition, subtraction, multiplication, and division between rasters at the cell level.	<b>M</b>
<b>SSS.05.09</b>	The software shall support conversion of raster cell values between integer and floating-point types with rounding options.	<b>M</b>
<b>SSS.05.10</b>	The proposed GIS desktop software must include a 2-year license with maintenance and support during a warranty period of two (2) years, starting from the date of Final System Acceptance Report.	<b>M</b>

## 2.5. Custom Software Specification

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### 2.5.1. Integrated Agricultural Information Platform (IAIP)

The Integrated Agricultural Information Platform (IAIP) will serve as the backbone of MAFWE’s digital transformation, providing a unified and standardized environment for the management of agricultural and rural development registries. Its strategic significance lies in its direct support to Monitoring and Evaluation (M&E) processes, which are essential for evidence-based policy making and for strengthening institutional readiness in the EU accession process.

At present, fragmented legacy systems and manual data collection practices result in inconsistencies, duplication, and delays that undermine the accuracy and reliability of statistical outputs and policy reports. By consolidating registries within a single platform, enforcing standardized data models and codebooks, and enabling automated validation, the IAIP will significantly improve the quality, consistency, and timeliness of input data.

This improvement in input data quality is a prerequisite for the effective functioning of the Business Intelligence (BI) platform, which depends on accurate and harmonized datasets to generate monitoring indicators, dashboards, and analytical reports. With the IAIP as the central transactional and registry system, the BI platform will operate on trustworthy datasets, reducing the risk of errors and enabling more robust analysis of sector performance, policy impact, and resource allocation.

In this way, the IAIP will not only modernize MAFWE’s operational processes but also ensure that the Ministry’s monitoring and evaluation framework is based on reliable, high-quality information—providing decision-makers with the insights they need to design effective interventions, demonstrate compliance with EU requirements, and improve service delivery to stakeholders.

To achieve these objectives, the IAIP will be structured into a set of core system modules, each addressing a critical functional area:

- **Authentication Module** – secure verification of user identities, integrated with national eID and interoperability frameworks.
- **Authorization (User Management) Module** – centralized management of user roles, access rights, and security policies across IAIP components.

- **GIS Support Module** – enterprise-level GIS services and desktop applications to manage spatial data within agricultural registries and domain-specific datasets
- **Registry and domain-specific datasets Management Modules** – consolidation of existing and development of new registries and domain-specific datasets under standardized models, including data migration from legacy systems.
- **Interoperability and Data Exchange Module** – standardized APIs and secure services for interconnection with external systems via the National Interoperability Platform.
- **Business Intelligence (BI) and Data Warehouse Module** – analytical environment for reporting, monitoring, and evaluation based on high-quality data from the IAIP.

### 2.5.1.1. Core System Modules

#### 2.5.1.1.1. Authentication Module

The Authentication Module will provide the foundation for secure access to the Integrated Agricultural Information Platform (IAIP). Its primary role is to verify the identity of all users—internal staff, external stakeholders, and citizens—before granting access to IAIP modules and services.

The module will not act as an isolated identity provider, but will integrate with existing national digital identity solutions, including the national eID system and the National Interoperability Platform (NIP) Identity Provider. Through this integration, the IAIP will ensure compliance with state-level standards for authentication, identity assurance, and secure access to e-government services.

The Authentication Module will also support traditional enterprise authentication mechanisms such as LDAP and Active Directory for internal users, as well as Single Sign-On (SSO) to provide seamless access across IAIP components. Multi-Factor Authentication (MFA) and secure session management will be mandatory to strengthen protection against unauthorized access.

By centralizing and standardizing authentication, the module will ensure that IAIP users always authenticate through trusted channels, thereby increasing overall system security, transparency, and user trust.

#### Authentication Module Detailed Requirements

Number	Feature	Type
<b>CSS.01.01</b>	The Authentication Module shall integrate with the national eID system as the primary identity provider for citizens and external stakeholders.	<b>M</b>
<b>CSS.01.02</b>	The module shall integrate with the National Interoperability Platform (NIP) Identity Provider for secure authentication of institutional users and services.	<b>M</b>
<b>CSS.01.03</b>	The module shall support LDAP and Active Directory integration for internal MAFWE staff.	<b>M</b>
<b>CSS.01.04</b>	The module shall support Single Sign-On (SSO) across all IAIP modules, ensuring that users log in once to access all authorized components.	<b>M</b>

Number	Feature	Type
CSS.01.05	The module shall support Multi-Factor Authentication (MFA), including combinations of password + OTP (SMS/email/app), smart cards, or biometric factors where supported by the national eID.	M
CSS.01.06	The module should enforce secure password policies (complexity, expiration, reuse prevention) for accounts managed outside of eID/SSO.	P
CSS.01.07	The module shall include secure session management: automatic logout after inactivity, prevention of concurrent sessions where required, and encrypted session tokens.	M
CSS.01.08	The module shall provide full audit logging of authentication events, including successful logins, failed attempts, MFA verifications, session start/end, and IP addresses.	M
CSS.01.09	The module shall support integration with external identity providers through standardized protocols (e.g., SAML 2.0, OAuth 2.0, OpenID Connect).	M
CSS.01.10	The module shall expose secure APIs for authentication services, documented in OpenAPI/Swagger format, to allow other IAIP components to validate user sessions.	M
CSS.01.11	The module shall support multilingual authentication interfaces (at least Macedonian, Albanian, and English).	M

#### 2.5.1.1.2. Authorization Module (User Management System)

The Authorization Module, also referred to as the User Management System (UMS), represents a critical component of the Integrated Agricultural Information Platform (IAIP). While the Authentication Module ensures the verification of user identity, the UMS defines and enforces what each authenticated user is allowed to do within the IAIP.

The module provides centralized and fine-grained control over user access to IAIP resources, including registry modules, datasets, APIs, GIS layers, and reporting tools. Through role-based access control (RBAC), administrators will be able to define roles, assign them to users, and manage permissions consistently across all IAIP components. In addition to role-level control, the UMS will support advanced authorization features such as row-level, attribute-level, and spatial-level security, ensuring that users can only access the data they are entitled to.

The UMS will also include workflow-driven management of user privileges, enabling approval processes when assigning roles or granting access to sensitive data. All authorization activities will be fully traceable, with audit logs capturing who performed an action, when, and on which resource, thereby ensuring accountability and compliance with national information security standards.

By consolidating authorization into a unified system, the UMS will strengthen institutional control, reduce administrative overhead, and provide transparency in how registry data and services are accessed. It will also ensure interoperability with other IAIP modules and external systems by exposing secure APIs for authorization queries and role validation.

#### Authorization Module (User Management System) Detailed Requirements

Number	Feature	Type
CSS.02.01	The User Management System (UMS) shall be developed as a secure, web-based application, providing centralized administration of users, roles, and access rights across all IAIP modules.	M
CSS.02.02	The UMS shall serve as the central point for managing users and permissions for all IAIP components, including web-based registry modules, GIS services, and mobile applications.	M
CSS.02.03	Access to the UMS shall be restricted to users with administrative privileges, with multiple administrative roles supported (e.g., system admin, module admin).	M
CSS.02.04	The UMS shall allow administrators to create, update, deactivate, and delete user accounts. Deletion must follow “soft delete” principles (records not physically removed).	M
CSS.02.05	The UMS should support users from different institutions and organizational units, enabling management of multi-tenant structures.	P
CSS.02.06	The UMS shall allow definition and management of resources (e.g., registry modules, menu items, APIs, web services, GIS layers, widgets).	M
CSS.02.07	The UMS shall allow dynamic creation of roles and assignment of resources to roles.	M
CSS.02.08	The UMS shall support assigning multiple roles to a single user, with effective privileges calculated as the union of assigned roles.	M
CSS.02.09	The UMS should allow administrators to define fine-grained privileges, including restrictions at record level (row-level security), attribute level (column-based), and spatial level (e.g., by municipality or region).	P
CSS.02.10	The UMS shall provide full audit logging of all authorization-relevant events (e.g., privilege assignments, data access changes).	M
CSS.02.11	Audit logs must capture at least: user ID, role, institution, IP address, timestamp, resource affected, type of action, old value, and new value.	M
CSS.02.12	The UMS shall provide secure APIs for integration with external systems and applications, documented in OpenAPI/Swagger format.	M
CSS.02.13	The UMS shall enforce configurable password and session policies, including password expiry, account lockout after failed attempts, and automatic logout after inactivity.	M
CSS.02.14	User Management System shall provide authentication support for, Active Directory, LDAP and SSO providers.	M
CSS.02.15	User Management System shall be integrated with SSO identity provider system from NIP.	M
CSS.02.16	The UMS shall support multilingual user interfaces (Macedonian, Albanian and English).	M

### 2.5.1.1.3. GIS Support Module

The GIS Support Module is a key functional component of the Integrated Agricultural Information Platform (IAIP), designed to provide web-based geospatial capabilities directly accessible through the IAIP application. While the GIS Server Platform ensures enterprise-level management and dissemination of spatial data, the GIS Support Module enables end-users –

both administrators and operational staff – to visualize, query, analyze, and edit geographic information in an intuitive and user-friendly environment.

The module integrates map services and geoprocessing tools into the IAIP interface, allowing users to work with vector and raster datasets, perform spatial and attribute-based queries, measure and annotate geographic features, and prepare customized outputs such as reports, exports, and printable maps.

The GIS Support Module ensures seamless interaction between spatial and alphanumeric data. Through synchronized map and table views, users can select, filter, and analyze data across registries in both geographic and tabular form, ensuring data consistency and improving usability. Advanced features such as multi-user vector editing, spatial filtering, and geoprocessing services will empower staff to maintain and update registry datasets in compliance with national and EU standards.

By embedding GIS functionalities directly into the IAIP Web Application, the module guarantees that all registry management activities with spatial components – whether related to land parcels, farms, livestock, or environmental zones – are supported within a single integrated environment, without requiring external desktop GIS tools for day-to-day operations.

In addition to standard 2D visualization and editing, the GIS Support Module shall provide access to 3D and raster analytical functionalities where applicable, leveraging services exposed by the GIS Server Platform. This includes the ability to visualize terrain surfaces, perform spatial overlays, and display analytical results (e.g., slope, elevation, or volume calculations) as thematic layers within the web interface.

### **Public WEB GIS Interface**

In addition to internal GIS functionalities, the IAIP shall support the establishment of a public-facing WEB GIS interface, enabling citizens, businesses, and other stakeholders to access selected agricultural datasets in a transparent and user-friendly manner.

The scope of publicly available spatial and alphanumeric data shall be defined during the Business Analysis phase and approved by MAFWE, in accordance with:

- applicable legislation on agricultural land and public information access;
- personal data protection requirements;
- national open data policies; and
- internal data governance rules of MAFWE.

The public WEB GIS interface shall provide controlled visualization and search capabilities for approved datasets and shall not expose restricted, confidential, or personal data.

The Supplier shall design the public interface as a secure, scalable and performance-optimized web application, technically separated from internal administrative functionalities but leveraging services provided by the GIS Server Platform.

The public WEB GIS interface shall operate over HTTPS using an SSL/TLS certificate provided by MAFWE or the competent national authority.

### GIS Support Module Detailed Requirements

Number	Feature	Type
<b>CSS.03.01</b>	The GIS support module must support zoom-in/zoom-out on the map to view different levels of detail.	<b>M</b>
<b>CSS.03.02</b>	The GIS support module must support panning around the map, capability to move the map view horizontally and vertically to explore different areas	<b>M</b>
<b>CSS.03.03</b>	The GIS support module must support zoom to full extent, to return the map to its default view, showing the full extent of the area	<b>M</b>
<b>CSS.03.04</b>	The GIS support module must support zoom to selected features and zoom to layer	<b>M</b>
<b>CSS.03.05</b>	The GIS support module must provide identify tool, allowing to click on map features to view detailed attribute information.	<b>M</b>
<b>CSS.03.06</b>	The GIS support module must support measuring distance and area on the map	<b>M</b>
<b>CSS.03.07</b>	The GIS support module shall always display real coordinates of the mouse pointer while moving mouse on the map.	<b>M</b>
<b>CSS.03.08</b>	The GIS support module shall provide tool for conversion of coordinates, at least between EPSG 6316, ETRS 89 and WGS 84 coordinate systems.	<b>M</b>
<b>CSS.03.09</b>	The GIS support module must support accessing hyperlinks contained in attribute data	<b>M</b>
<b>CSS.03.10</b>	The GIS support module must provide ToC (Table of Content) widget, interface to toggle visibility of different map layers	<b>M</b>
<b>CSS.03.11</b>	The GIS support module must provide layer legend widget, allowing to display legend to understand the symbols and colors used in different layers	<b>M</b>
<b>CSS.03.12</b>	The GIS support module must support setting transparency for all layers visible on the ToC	<b>M</b>
<b>CSS.03.13</b>	The GIS support module must provide search and query widget, allowing users to find map features that satisfy search criteria.	<b>M</b>
<b>CSS.03.14</b>	The GIS support module must provide spatial search widget, allowing users to find map features based on their geographic location, e.g. features that intersect with point, line, polygon, rectangle, circle and free-hand polygon	<b>M</b>
<b>CSS.03.15</b>	The GIS support module must support selection of map features from one layer, that intersect with selected polygon features from another layer	<b>M</b>

<b>CSS.03.16</b>	The GIS support module must provide tools for export of resulting data sets into the most popular file formats (XLSX, CSV, PDF, DOCX, GPX, SHP, SQLite, etc.) for direct usage and/or further data processing and preparing of ad-hoc reports.	<b>M</b>
<b>CSS.03.17</b>	The GIS support module must support users to interactively exclude specific features from the display (filtering the map)	<b>M</b>
<b>CSS.03.18</b>	The GIS support module must support working with more than one raster base-map, with the possibility for the user to choose which base-map will be visible when	<b>M</b>
<b>CSS.03.19</b>	The GIS support module must support working with raster and vector data at the same time	<b>M</b>
<b>CSS.03.20</b>	The IAIP must support entry and editing of spatial and attribute data in a defined database structure, allowing validation, analysis, and integration with other registry datasets.	<b>M</b>
<b>CSS.03.21</b>	The GIS support module must support creating bookmarks, when the user wants to draw attention to particular areas in a map	<b>M</b>
<b>CSS.03.22</b>	The GIS support module must support users to create simple markups, including points, lines, polygons, and text on maps. Drawn elements are intended for temporary usage only, could be printed together with other map content, but cannot be saved into database.	<b>M</b>
<b>CSS.03.23</b>	The GIS support module must provide a tool for vector data editing in multi-user database environment. The tool must support users to add, delete, and update features in the source data, 2D editing, including move, scale, rotate geometries, and vertices editing.	<b>M</b>
<b>CSS.03.24</b>	The GIS support module must support printing a map, with the possibility to choose print template and to set printing area	<b>M</b>
<b>CSS.03.25</b>	The GIS support module must support temporary addition of new map layers, by uploading CSV, SHP, GeoJSON, KML or GPX files, or by loading WMS, WFS, WMTS, vector tile service, image service and scene service	<b>M</b>
<b>CSS.03.26</b>	Besides spatial view, The GIS support module must support displaying alphanumerical data in a tabular view, with possibility to show/hide selected columns and sort ascending/descending data by any column	<b>M</b>
<b>CSS.03.27</b>	Map and tabular view must be connected in a way when user selects a record(s) from the table, the same records must be selected on the map and vice-versa.	<b>M</b>
<b>CSS.03.28</b>	The GIS support module must support geoprocessing services for selection and export of vector data in at least CSV, SHP and GeoJSON format	<b>M</b>
<b>CSS.03.29</b>	The GIS support module should allow visualization of 3D layers (e.g., terrain, buildings, or analytical surfaces) if published by the GIS Server Platform, including basic tools for navigation, tilt, and elevation exaggeration.	<b>P</b>

<b>CSS.03.30</b>	The GIS support module should support the display of raster analytical outputs (e.g., slope, hillshade, NDVI) generated through the GIS Server Platform or external geoprocessing services.	<b>P</b>
<b>CSS.03.31</b>	The GIS Support Module shall include a public-facing WEB GIS interface for visualization of authorized spatial datasets.	<b>M</b>
<b>CSS.03.32</b>	The public WEB GIS interface shall support map navigation (zoom, pan, full extent), layer visibility control, and legend display.	<b>M</b>
<b>CSS.03.33</b>	The public WEB GIS interface shall support attribute-based search and basic spatial search for authorized datasets.	<b>M</b>
<b>CSS.03.34</b>	The public WEB GIS interface shall ensure that only datasets explicitly approved by MAFWE are publicly accessible.	<b>M</b>
<b>CSS.03.35</b>	The public WEB GIS interface shall prevent access to restricted or personal data through role-based filtering and service-level security controls.	<b>M</b>
<b>CSS.03.36</b>	The public WEB GIS interface should be optimized for responsive design to allow access from desktop and mobile browsers.	<b>P</b>

#### 2.5.1.2. Functional Modules

Registry and **domain-specific datasets** Management Module (RMM) represents the **central application layer** of the Integrated Agricultural Information Platform (IAIP). Through the IAIP web application, all registry and domain-specific datasets related processes will be managed, including data entry, validation, updating, reporting, and integration and interconnection with external systems.

The RMM provides a unified environment for MAFWE staff and authorized external users, ensuring that all registries legally mandated to the Ministry are managed under standardized data models and codebooks. The web application serves as the main interface for day-to-day operations, while also feeding validated data into the Business Intelligence (BI) platform for monitoring and evaluation purposes.

Within the RMM, two categories of requirements are defined:

- **General Requirements (GR)** – These represent cross-cutting quality attributes of the IAIP web application, such as availability, performance, usability, scalability, multilingual support, security, and auditability. Although presented within this module, they apply to the entire IAIP environment, ensuring consistency across all components and modules.
- **Functional Requirements (FR)** – Functional Requirements (FR) define the detailed functional scope of registries, modules, and domain-specific datasets to be implemented within the IAIP.
  - ✓ First, this section specifies the functional requirements for replacing existing standalone (“island”) applications with dedicated IAIP modules (including the Farm Register, LPIS, ISET, and other existing systems).
  - ✓ Second, it defines the functional requirements for the SALMIS module as a core system for the management of state-owned agricultural land.

- ✓ Third, it outlines the functional requirements for establishing new registries and domain-specific datasets for which no IT solutions currently exist. These are grouped by thematic area to ensure consistency, efficiency, and avoidance of functional and data duplication.

References to Monitoring and Evaluation (M&E) indicators within individual IAIP modules are indicative and reflect the primary indicators to which the module contributes. The final calculation, aggregation, and reporting of indicators shall be performed through the IAIP analytical and reporting components, in accordance with the Monitoring and Evaluation framework defined in Section 2.7.

#### 2.5.1.2.1. General Requirements

The General Requirements (GR) define the quality attributes and operational standards that the IAIP Web Application must meet to ensure reliability, usability, security, and long-term sustainability. Unlike functional requirements, which describe *what* the system should do, the NFRs describe *how well* the system must perform its functions.

For MAFWE, general aspects are especially critical because the IAIP will become the single-entry point for managing all agricultural registries and domain-specific datasets, replacing multiple legacy applications and serving a diverse group of users – from ministry staff to regional offices, inspectors, and external stakeholders. Therefore, the IAIP web application must guarantee high availability, consistent performance, scalability to accommodate future registries, and strict compliance with national information security and interoperability standards.

The NFRs also ensure accessibility and usability: the system must provide a user-friendly interface aligned with MAFWE’s visual identity, support multiple languages (Macedonian, Albanian, English), and always include contextual help and user manuals accessible. Equally important are auditability and traceability, which ensure that all user actions are logged for regulatory compliance and institutional accountability.

By setting these requirements, MAFWE establishes a foundation for a modern, resilient, and future-proof IAIP web application. The NFRs outlined in the following section apply not only to the Registry Management Module but also extend across all IAIP components, ensuring a consistent standard of quality for the entire system.

#### General Requirements

Number	Feature	Type
	<b>General Requirements</b>	
<b>CSS.04.01</b>	The IAIP must be designed as a web application	<b>M</b>
<b>CSS.04.02</b>	The look & feel of the IAIP must be in line with the visual identity applied to the MAFWE communication. The Supplier shall prepare and present a proposed design (UI/UX concept and style guide) of the system to the designated MAFWE representatives prior to the start of system development. The commencement of development activities	<b>M</b>

	shall be conditional upon obtaining formal approval of the proposed design by MAFWE.	
<b>CSS.04.03</b>	The interface must be provided in Macedonian, Albanian and English language	<b>M</b>
<b>CSS.04.04</b>	User manual must be provided and accessible in any section of the IAIP	<b>M</b>
<b>CSS.04.05</b>	Contextual help online must be provided in any section of the IAIP	<b>M</b>
<b>CSS.04.06</b>	The IAIP must provide hover-over tooltips providing brief descriptions of tools and functionalities	<b>M</b>
<b>CSS.04.07</b>	The IAIP must provide information on how to contact support for help on how to use the application	<b>M</b>
<b>CSS.04.08</b>	The interface must drive the user in following the correct workflow, displaying/hiding the correct functionalities depending on the context.	<b>M</b>
<b>CSS.04.09</b>	The IAIP must support 300+ concurrent users	<b>M</b>
<b>CSS.04.10</b>	The IAIP must ensure high availability with a defined SLA (e.g., 99.9% uptime).	<b>M</b>
<b>CSS.04.11</b>	<p>The IAIP must respond to user interaction in an acceptable time, as described below:</p> <ul style="list-style-type: none"> <li>– &lt; 1 sec: for simple interactions (for ex. layer toggles, zoom, pan)</li> <li>– 1-3 sec: for moderate tasks (attribute queries, loading vector layers with limited features, switching map views)</li> <li>– 3-5 sec: for complex tasks (spatial queries with filtering, loading heavier datasets, map redraws with multiple layers)</li> <li>– &gt; 5 sec: for long transactions (advanced geoprocessing (clip, buffer, analysis), download/import/export operations, connecting to external services or large databases), For such transactions IAIP should display a progress indicator or spinner.</li> </ul>	<b>M</b>
<b>CSS.04.12</b>	The IAIP must be able to scale horizontally and/or vertically to accommodate growing user bases	<b>M</b>
<b>CSS.04.13</b>	The IAIP must be built in a fault tolerance architecture	<b>M</b>
<b>CSS.04.14</b>	The IAIP shall be client-server based	<b>M</b>
<b>CSS.04.15</b>	On the client side only a web browser, PDF viewer and MS Office viewer is needed to work with the IAIP, no other software components	<b>M</b>
<b>CSS.04.16</b>	Communication with the IAIP must be encrypted	<b>M</b>
<b>CSS.04.17</b>	The IAIP must provide test and production environment on-site, and development environment at the Supplier's site.	<b>M</b>
<b>CSS.04.18</b>	The developed software must be managed in a version control repository	<b>M</b>

<b>CSS.04.19</b>	The source code must be provided by contractor in “human readable” format	<b>M</b>
<b>CSS.04.20</b>	The IAIP must be able to manage the historical data. Any change in the database must be archived and it must be possible to view and to restore the database at a specific date	<b>M</b>
<b>CSS.04.21</b>	The IAIP must support audit trails for regulatory compliance	<b>M</b>
<b>CSS.04.22</b>	The development of the IAIP could be based on using Free Open-Source Software (FOSS) or based on Commercial of The Shelf Software (COTS). In any case, a justification of the proposed solution must be provided in term of costs and benefits.	<b>I</b>
<b>CSS.04.23</b>	The source code <b>MUST</b> be written using clear and precisely described conventions for naming classes, functions, variables, with mandatory use of comments. As a rule, the source code <b>MUST</b> have a comment at the beginning that tells what the software is doing. Each class and function <b>MUST</b> have an explanation of what they do and how, while the functions additionally specify what values are retrieved and what value they return. It is also important that every complex part of the application should be commented on	<b>M</b>
	<b>Codebooks and Data Validation</b>	
<b>CSS.04.24</b>	To minimize typing errors that usually occur with free entry of data, wherever is possible in the application shall be used codebooks, so the end-user can choose one of the pre-defined allowed values from a drop-down list.	<b>M</b>
<b>CSS.04.25</b>	The codebooks shall have possibility to add new records, as well as to change and/or delete the existing records	<b>M</b>
<b>CSS.04.26</b>	Deleted records shall not be physically removed from the database, only must be invisible through the UI of the application	<b>M</b>
<b>CSS.04.27</b>	The user must fill in values for all mandatory fields.	<b>M</b>
<b>CSS.04.28</b>	The IAIP must guarantee the uniqueness of all records, i.e. it must not allow the same record to be entered more than once.	<b>M</b>
<b>CSS.04.29</b>	The IAIP must not allow deletion of a codebook entry if that entry appears as a related entry in other tables.	<b>M</b>

The above General Requirements establish the quality baseline for the IAIP Web Application and apply uniformly across all modules, including registry management, interoperability, GIS, and BI components. Subsequent sections detail the specific functional requirements for each module.

#### **2.5.1.2.2. Registry Management Modules – Replacement of Legacy IT Systems**

A key objective of the Integrated Agricultural Information Platform (IAIP) is to consolidate and modernize the fragmented IT landscape within MAFWE by replacing legacy applications with unified, interoperable modules. Over time, multiple “island” systems have been developed to support specific business processes such as the Farm Register, LPIS, Agricultural

Cooperatives Monitoring System, ISET, Agricultural Products Buyers, Organic Production Register and the AMIS. These systems vary in technical architecture, functionality, and level of maturity, often lacking interoperability and creating bottlenecks for data consistency and reporting.

The new IAIP will replace these standalone systems with dedicated registry management modules designed to cover the same functional scope while also adding enhanced features such as ~~standardized~~ optimized workflows, possibility for data validation, interoperability interfaces, and integrated reporting. Each module will ensure secure migration of historical data from the legacy solution, parallel operation where necessary during the transition phase, and a structured decommissioning process for the old system once the new module reaches full operational capacity.

In this way, the IAIP should not only replicate existing functionalities but also should introduce harmonized data models, improved user experience, and seamless integration with the centralized data warehouse and BI platform. This will provide MAFWE with a modernized environment that strengthens institutional capacity, reduces duplication, and ensures compliance with both national and EU-level requirements.

#### **2.5.1.2.2.1. Farm Register Module**

##### **Module Overview and Objectives**

The **Farm Register (FR)** represents the national reference register for farms and agricultural holdings in the Republic of North Macedonia and serves as a cornerstone for transparent, efficient, and EU-compliant administration of agricultural policies and support schemes. It is a legally mandated information system established for the registration, updating, and monitoring of agricultural holdings and farmers, operating pursuant to the **Law on Agriculture and Rural Development** and related by-laws.

The Farm Register provides a legal and statistical basis for the implementation of **direct payment schemes, rural development programs, and inspection controls**, while supporting policy monitoring and reporting at both national and EU level. It ensures accurate and up-to-date information on farm structures, land, production, and related resources, thereby strengthening the evidence base for agricultural policy planning and implementation. Within the Farm Register, a Production Plan is maintained, which refers to the recording of agricultural crops at the level of individual LPIS parcels.

Within the IAIP, the Farm Register will function as a core transactional module, built on a modern, service-oriented architecture that ensures:

- Interoperability with national databases such as the Central Registry of Companies, the Population Register, and other government systems through the National Interoperability Platform (NIP) operated by the Ministry of Digital Transformation (MDT);
- Integration with LPIS spatial data for cross-verification of land parcels and agricultural activities;
- Integration with SALMIS spatial data for cross-verification of state-owned land parcels and agricultural activities;

- Integration with other internal domain-specific datasets in order to exchange a single set of data without duplicating it across multiple systems.
- Secure data exchange through APIs with other external systems and controlled access protected by next-generation firewalls implemented under this project; and
- Provision of e-services for farmers through the national e-Services portal (euslugi.gov.mk).

Through interoperability and secure data exchange, the FR underpins processes such as subsidy allocation, compliance monitoring, risk prevention, and rural development programming.

The modernization of the legacy Farm Register into a fully integrated IAIP module will ensure greater accuracy, transparency, and efficiency in agricultural policy management, reduce administrative burden for both farmers and institutions, and align the system with **EU Common Agricultural Policy (CAP)** standards and best practices.

The Farm Register provides the primary data source for a wide range of **Monitoring and Evaluation (M&E)** indicators defined in Section 2.7. of the IAIP specification. Its datasets form the foundation for **output indicators** (*I-O1, I-O2, I-O3, I-O4*), **result indicators** (*I-R2, I-R5, II-R9*), and **structural, socio-economic, and thematic indicators** derived directly from farm registration data (*FR-S01–FR-S06, FR-L01–FR-L10, FR-A01–FR-A05, FR-SE01–FR-SE05, FR-T01–FR-T03*). Through these data flows, the Farm Register ensures the consistency of time-series datasets used across the IAIP, particularly those linked with LPIS, IACS, ISET, and the Registers of Buyers and Animals.

The migration of Farm Register datasets to the new IAIP module shall follow the guidelines set out in **Section 2.5.2. (Data Conversion and Migration)**, considering the technical details on the database type and version specified in **Annex A – Analysis of Existing IT Solutions**.

The following section presents the **functional requirements** for the Farm Register module, detailing the business processes, data structures, and user interactions that need to be mapped and upgraded within the new IAIP framework.

### Farm Register Module – Detailed Requirements

Number	Process	Feature	Type
<b>CSS.05.01</b>	Application Intake – Online and Local Submission	The IAIP shall support online application submission for registration or update in the Farm Register through an authenticated user account (SSO/eID). Applicants may complete and submit digital forms with electronic signature and attach supporting documents. For transitional compatibility, the system shall also support manual submission of paper forms at Local MAFWE Offices, where authorized staff will input the data into the IAIP.	<b>M</b>
<b>CSS.05.02</b>	Case Registration (SR1 Reference – Subject Register)	For all applications (online or local), the system shall automatically generate or link to a unique SR1 case number from the administrative case registry maintained at local offices. Integration	<b>M</b>

	Reference Number)	with the central case management system shall ensure unique numbering and traceability.	
<b>CSS.05.03</b>	Unique Farm Identifier (IDBR) – Generation and Validation	Upon approval of a new registration, the IAIP shall generate a Unique Farm Identifier (IDBR) according to national format rules (10-digit sequential number plus 1-digit checksum calculated by modulus 11). The system shall validate IDBR uniqueness across all farm records and prevent duplicates.	<b>M</b>
<b>CSS.05.04</b>	Digital Application for Existing Farm	Registered farms may update their data via an online form pre-filled with existing records. Authorized local officers may also initiate updates for farms under their jurisdiction.  Regardless of who initiated it, the change of data must be approved by the responsible persons in the MAFWE  The system shall maintain full versioning and audit trail of all updates.	<b>M</b>
<b>CSS.05.05</b>	Advanced Search and Filtering	The system shall provide flexible search across key identifiers (IDBR, EMBG, tax ID, RBO, farm name, parcel number, crop code, status, municipality). Full-text and multi-criteria search shall be supported, with role-based visibility for sensitive data.	<b>M</b>
<b>CSS.05.06</b>	Digital Data Capture Forms (1A–6)	The IAIP shall provide configurable digital forms for farm data capture, covering farm holder (individual or legal entity), household members, production capacities, parcels, crops, machinery, and livestock. Each form shall include real-time validation, dropdowns from central codebooks, and automated cross-linking with LPIS, SALMIS, Animal Register, and cadastre systems.	<b>M</b>
<b>CSS.05.07</b>	Data Consistency and Validation Controls	All mandatory fields must be completed. Validation of identifiers (EMBG, tax ID, IBAN, parcel codes, crop codes) shall occur in real time using official code lists and interoperability services.	<b>M</b>
<b>CSS.05.08</b>	Administrative Checks and Attachments	The system shall support both automated and manual administrative checks for completeness and required documents. Operators or reviewers shall record outcomes directly in the IAIP. Scanned or uploaded documents are stored as digital attachments.	<b>M</b>

<b>CSS.05.09</b>	Electronic Archive and Document Management	All scanned or uploaded application documents shall be stored in the central IAIP document repository, supporting metadata search, versioning, and integrity verification (checksum/hash).	<b>M</b>
<b>CSS.05.10</b>	Decision Management	The IAIP shall support generation and storage of registration and closure decisions with unique numbers, legal references, and timestamps. Decisions shall be available for printing or electronic delivery via the e-Services Portal.	<b>M</b>
<b>CSS.05.11</b>	Notifications and Messaging	The IAIP shall issue automated notifications (via email, SMS, or in-portal messages) to applicants regarding submission, missing information, and decision outcomes. Local offices can also generate printed notices where required.	<b>I</b>
<b>CSS.05.12</b>	Reference Data Interoperability	The IAIP shall not maintain local editable codebooks for municipalities or cadastral municipalities. These shall be retrieved via interoperability services from the State Statistical Office (SSO) and the Agency for Real Estate Cadastre (AREC) respectively. The IAIP may keep a cached read-only copy for contingency purposes, including the last synchronization date and external identifiers (links to the source registry). No CRUD operations (create, update, delete) shall be allowed on these reference datasets within IAIP.	<b>M</b>
<b>CSS.05.13</b>	Codebook Synchronization and Version Control	The system shall synchronize internal reference lists with external authoritative sources according to predefined schedules and interoperability protocols. Each synchronization event shall log timestamp, user (if manual), and status. The IAIP shall ensure backward compatibility with previously valid code versions for historic records.	<b>M</b>
<b>CSS.05.14</b>	User Roles and Permissions	The system shall define user roles such as Local Office Operator, Supervisor, Central Administrator, Inspector/Auditor, and Read-only Analyst. Each role shall have predefined access rights aligned with the principle of least privilege.	<b>M</b>
<b>CSS.05.15</b>	Role-Based Access Control (RBAC)	Access to functions and data shall be managed through RBAC. Sensitive personal data shall be masked or anonymized for non-privileged users.	<b>M</b>

<b>CSS.05.16</b>	Session Management and Security	The IAIP shall enforce session timeout, concurrent login control, and password/SSO policies. System access shall comply with MAFWE and MDT cybersecurity guidelines.	<b>M</b>
<b>CSS.05.17</b>	Integration with LPIS	The Farm Register shall integrate with the LPIS to exchange parcel and crop data through secure APIs or web services. Real time synchronization shall ensure consistency between systems.	<b>M</b>
<b>CSS.05.18</b>	Integration with SALMIS	The Farm Register shall integrate with the SALMIS module to exchange info about state-owned parcel and crop data through secure APIs or web services. Real time synchronization shall ensure consistency between systems.	<b>M</b>
<b>CSS.05.19</b>	Interoperability with Cadastre (AREC)	The IAIP shall connect to the Cadastre (AREC) services for parcel verification and attribute retrieval where legally permitted.	<b>M</b>
<b>CSS.05.20</b>	Interoperability with Veterinary/Animal Identification System	The Farm Register shall exchange livestock data (ear tag numbers, species, holdings) with the competent veterinary authority to ensure consistency of animal identification records.	<b>M</b>
<b>CSS.05.21</b>	Integration with Sectoral Registers	The IAIP shall enable data exchange with sectoral registers such as the Register of Cooperatives, Advisors, and Licensed Providers of Advisory Services to ensure coherence across agricultural information systems.	<b>M</b>
<b>CSS.05.22</b>	Interoperability with Subsidy/Paying Agency System	The Farm Register shall provide verified farm master data to the payments system operated by AFSARD and receive feedback on eligibility and compliance where applicable.	<b>M</b>
<b>CSS.05.23</b>	Data Migration	Migration of Farm Register datasets from the existing Oracle 11g environment shall follow the procedures defined in Section 2.5.2 (Data Conversion and Migration), using technical details from Annex A.	<b>M</b>
<b>CSS.05.24</b>	Audit Log and Traceability	The IAIP shall record all create, update, and delete operations, decisions, logins, approvals, and exports with timestamps and user identification. Each field change shall retain previous and new values, change reason, and linked reference.	<b>M</b>

<b>CSS.05.25</b>	Validation Error Handling	The system shall display clear and human-readable error messages for validation errors, guiding the user toward correction.	<b>M</b>
<b>CSS.05.26</b>	Business Rule Exceptions	The system shall manage business rule exceptions (e.g., duplicate parcel association, missing identifiers) using controlled override workflows for authorized users.	<b>M</b>
<b>CSS.05.27</b>	Data Retention and Archiving Policy	The IAIP shall retain records and documents in line with national archival regulations and configurable retention periods defined by MAFWE.	<b>M</b>
<b>CSS.05.28</b>	Closure and Read-Only Archiving	Upon farm closure, the IAIP shall maintain a read-only historical record linked to related cases, parcels, and administrative decisions.	<b>M</b>
<b>CSS.05.29</b>	Reporting and Analytics	The IAIP shall provide predefined and ad-hoc reporting functions (farms by region/status, crop areas, livestock counts, machinery inventory, registration activity). Authorized users may export data to standard formats (CSV/XLS/PDF).	<b>M</b>
<b>CSS.05.30</b>	OLAP and Data Cubes for Analysis	MAFWE may require selected reports to be implemented as OLAP cubes, allowing multidimensional analysis by region, gender, crop, or measure type.	<b>I</b>
<b>CSS.05.31</b>	Interoperability with National e-Services Portal	The IAIP shall expose selected functionalities (e.g., status tracking, electronic document retrieval) through the National e-Services Portal (euslugi.gov.mk).	<b>I</b>
<b>CSS.05.32</b>	API and Data Exchange Standards	All IAIP integrations shall comply with the National Interoperability Framework (NIF) standards and use secure REST/SOAP APIs with audit logging.	<b>M</b>
<b>CSS.05.33</b>	GDPR and Personal Data Protection	All processing of personal data in the Farm Register shall comply with GDPR and national data protection laws. Access, consent, and audit mechanisms shall be built-in.	<b>M</b>
<b>CSS.05.34</b>	Version Control of Records	Each update to farm, parcel, or livestock records shall be versioned with a timestamp and operator ID to ensure full traceability of historical data.	<b>M</b>
<b>CSS.05.35</b>	Record Linking Across IAIP Modules	The IAIP shall maintain relational links between the Farm Register and the registers that are covered by other modules (LPIS, SALMIS, ISET, AMIS, Monitoring Software for Agricultural Cooperatives, Information System	<b>I</b>

		for Agricultural Products Buyers and Organic Production Information System) as well as the registers and domain-specific datasets that need to be developed and are not covered by these systems.	
<b>CSS.05.36</b>	Data Quality Dashboard	The IAIP shall include a dashboard for monitoring data quality indicators such as completeness, duplication rate, and last update date.	<b>I</b>
<b>CSS.05.37</b>	Historical Data Access	Authorized users shall be able to access historical versions of farm records for audit and analytical purposes.	<b>M</b>
<b>CSS.05.38</b>	Bulk Data Import and Export	Administrators shall be able to perform controlled bulk data imports and exports under logged and authorized procedures.	<b>I</b>
<b>CSS.05.39</b>	Change Notification to Dependent Systems	When critical attributes are updated (e.g., farm status, IDBR), the IAIP shall trigger notifications or API calls to dependent systems such as LPIS, SALMIS or the Payment Agency.	<b>I</b>
<b>CSS.05.40</b>	Help and Guidance	The IAIP shall include contextual help, tooltips, and user manuals accessible from the interface to guide users through registration and update procedures.	<b>P</b>
<b>CSS.05.41</b>	Testing and training environment	A dedicated testing environment shall be used for all user training activities and for testing new releases, patches, and configuration changes. The testing environment shall replicate the production data model and configuration, while excluding any real production data.	<b>P</b>
<b>CSS.05.42</b>	System Logging and Monitoring	The IAIP shall maintain technical logs for performance, integration errors, and API calls, accessible only to system administrators.	<b>M</b>
<b>CSS.05.43</b>	Backup and Recovery	Automated backup and recovery procedures shall ensure business continuity in accordance with MAFWE's ICT Disaster Recovery Plan.	<b>M</b>
<b>CSS.05.44</b>	Read-Only Access to Legacy Farm Register	For the purpose of functional analysis, requirements alignment, and data migration planning, MAFWE will provide the selected Supplier with secure, read-only access to the existing Farm Register environment. The access will allow review of data structures, forms, validation rules, and workflows implemented in the legacy system. No modification or data	<b>I</b>

		entry will be permitted. The Supplier shall maintain full confidentiality of all observed information and comply with applicable data protection regulations.	
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#### 2.5.1.2.2.2. LPIS Module

##### Module Overview and Objectives

The **Land Parcel Identification System (LPIS)** represents the central spatial reference database for all agricultural parcels eligible for support under direct payment and rural development measures. It provides accurate and reliable geospatial information on land use, parcel boundaries, and ownership or lease status, thereby ensuring that agricultural subsidy schemes are implemented transparently and efficiently.

As an essential control component of the Integrated Administration and Control System (IACS), LPIS provides spatial verification and cross-referencing of declared land parcels. While the verification of farmer applications is under the competence of the Direct Payments Application System managed by the Payment Agency (PA), LPIS ensures spatial integrity by identifying overlaps between declared parcels located in the same area.

In such cases, LPIS automatically freezes the overlapping areas for both agricultural holdings until the dispute over the ownership or use rights of the specific parcel is resolved by the competent authority.

Through these spatial controls, LPIS supports the prevention of irregularities, double claims, and fraud, and contributes to transparent and efficient policy implementation in line with agri-environmental and Good Agricultural and Environmental Condition (GAEC) standards.

The LPIS functions as a **Geographic Information System (GIS)** that provides graphical representation and localization of agricultural parcels while calculating the total arable area across the country. During digitization, based on updated orthophotos and with the consent of farm holders, parcels are graphically delineated, and their area and land-use type are automatically calculated. The integration of LPIS with the **Farm Register (FR)** ensures full correspondence between graphical and alphanumeric datasets at the parcel level, enabling verification of overlaps between LPIS polygons and cadastral parcels obtained from the **Agency for Real Estate Cadastre (AREC)**.

This spatial verification process is further refined through attribute data imported from the Farm Register, specifically the cadastral parcels recorded within the FR, thereby allowing cross-checking and validation of declared agricultural activities and crops against the official spatial data.

Within the **Integrated Agricultural Information Platform (IAIP)**, LPIS will serve as a **core geospatial module**, interoperable with the **Farm Register**, the **Payment System** operated by AFSARD, and inspection services and supervisory authorities that require spatial data for evidence-based monitoring and control. The LPIS will also ensure interoperability with external geodata services such as the **National Spatial Data Infrastructure (NSDI)** and the **Agency for Real Estate Cadastre (AREC)** through standardized **OGC/INSPIRE-compliant services** (WMS, WFS, WCS). All spatial and transactional data exchanges will be performed securely through the **National Interoperability Platform (NIP)**, with network-level protection provided by next-generation firewalls supplied under this Project.

The LPIS provides the core geospatial data source for several **Monitoring and Evaluation (M&E)** indicators defined in Section 2.7. of the IAIP specification. LPIS datasets underpin **output indicators** (*I-O1, I-O2, I-O3, I-O4*) and **result indicators** (*II-R2, II-R5, II-R9*), as well as structural and environmental indicators related to land use, irrigated versus rainfed areas, and land under agri-environmental commitments (*LPIS-L01–LPIS-L10, LPIS-E01–LPIS-E05, LPIS-R01–LPIS-R03*).

The migration and transfer of LPIS geospatial data to the new IAIP module shall follow the procedures defined in **Section 2.5.2. (Data Conversion and Migration)** and the technical details provided in **Annex A – Analysis of Existing IT Solutions**. All vector and raster datasets (orthophotos, parcel boundaries, and reference layers) shall be transferred **as-is** from the existing LPIS environment, converted into a **standardized spatial data format**, and aligned with the **Macedonia State Coordinate System (EPSG:6316)**. The Supplier shall not modify or correct spatial data (e.g., overlaps, gaps, or topology errors) but shall ensure the complete and lossless migration of all datasets, attributes, and metadata. Data integrity and coordinate consistency shall be verified and documented according to the methodology defined in Section 2.5.2.2.

The following section presents the **detailed functional requirements** for the LPIS module, specifying the core processes, spatial data management functions, and analytical tools that shall be developed or upgraded within the new IAIP framework.

#### LPIS Module – Detailed Requirements

Number	Process	Feature	Type
<b>CSS.06.01</b>	Compliance and Architecture	The LPIS module shall comply with CAP/IACS EU regulations and INSPIRE standards, providing a web-based, user-friendly GIS application for reference parcel management and visualization.	<b>M</b>
<b>CSS.06.02</b>	Web-Based Platform	The system shall operate as a fully web-based platform, accessible through modern browsers, supporting scalable deployment in centralized or hybrid environments.	<b>M</b>
<b>CSS.06.03</b>	Spatial Editing and Validation	The web GIS editor shall allow digitization and editing of polygons, holes, lines, and points, including snapping, reshaping, merging, and splitting, with real-time validation against topology rules for newly created or updated data.	<b>M</b>
<b>CSS.06.04</b>	Parcel Versioning	Each parcel shall maintain a complete version history with timestamps, enabling temporal queries, rollback, and auditability of all spatial and attribute changes.	<b>M</b>
<b>CSS.06.05</b>	Thematic Layers Management	The LPIS module will support the management/editing of multiple thematic layers (e.g., layer with landscape features, water areas, organic production, irrigation, apiaries, protected areas, grasslands, forestry, water resources) with	<b>M</b>

		metadata and classification aligned with INSPIRE.	
<b>CSS.06.06</b>	Integration with DTM	The system should enable integration and visualization of the latest Digital Terrain Model (DTM) and calculate elevation, slope and aspect parameters for reference parcels from the physical boundary graphic layer.	<b>M</b>
<b>CSS.06.07</b>	Graphical Layer of Physical Parcels	The system shall support the integration and simultaneous visualization of the national graphical layer of official physical parcel boundaries (AREC) together with the LPIS production parcels within the LPIS application and its modules. This requirement refers to visualization only.	<b>M</b>
<b>CSS.06.08</b>	Editing of Physical Parcels	Authorized users shall be able to edit and update the physical parcel boundaries and land-use types within the LPIS graphical layer. The system shall perform automatic topological validation during the editing process (e.g., overlaps, gaps, slivers) to ensure geometric consistency.	<b>M</b>
<b>CSS.06.09</b>	Reference Parcels of Agricultural Holdings	The system shall enable integration and visualization of the updated graphical layer of reference parcels of agricultural holdings, ensuring synchronization with the Farm Register.	<b>M</b>
<b>CSS.06.10</b>	Geospatial Web Services	The LPIS module shall provide OGC-compliant services (WMS, WFS, WCS) for orthophotos, DTM, and graphical parcel layers, including access through the National Interoperability Platform (NIP).	<b>M</b>
<b>CSS.06.11</b>	Interoperation with External Systems	The LPIS shall interoperate with the Farm Register, IACS, Cadastre (AREC), NSDI GeoPortal, Organic Production Register, and other systems as defined in the IAIP interoperation plan.	<b>M</b>
<b>CSS.06.12</b>	Quality Assurance and Control (QA/QC)	The system shall include a continuous QA/QC module with multi-step validation, automated geometric and attribute checks, and configurable business rules dashboards.	<b>M</b>
<b>CSS.06.13</b>	LPIS Quality Assessment (ATS/ETS)	The LPIS shall include a Quality Assessment sub-module supporting ATS/ETS testing in accordance with actual EC Regulations 2116/2021, 1172/2022, 1173/2022 and JRC guidelines.	<b>M</b>

<b>CSS.06.14</b>	Imagery and Remote Sensing	The LPIS shall support the integration of satellite imagery (Sentinel, Copernicus), drone imagery, orthophotos, and geotagged photographs for monitoring and update purposes, with optional change detection using artificial intelligence.	<b>P</b>
<b>CSS.06.15</b>	Spatial Consistency Checks	Cross-layer consistency checks shall be supported with configurable validation rules and interactive reporting tools.	<b>M</b>
<b>CSS.06.16</b>	REST and OGC APIs	The system shall expose data and functionality via RESTful and OGC-compliant APIs, ensuring backward compatibility for legacy SOAP-based integrations where required.	<b>M</b>
<b>CSS.06.17</b>	Access and Roles	User access shall be controlled through centralized IAM, with role-based permissions and secure authentication via the IAIP platform.	<b>M</b>
<b>CSS.06.18</b>	Audit and Traceability	The LPIS shall maintain audit logs for all spatial and attribute changes, including user ID, timestamp, operation type, and associated metadata.	<b>M</b>
<b>CSS.06.19</b>	Documentation and Training	Comprehensive technical documentation, API references, user manuals, and training materials shall be provided, including digital guides and hands-on sessions.	<b>M</b>
<b>CSS.06.20</b>	Read-Only Access to Legacy LPIS	For the purpose of analysis and data migration preparation, the selected Supplier will be granted secure, read-only access to the existing LPIS environment to review data structures, workflows, and metadata without authorization to modify data.	<b>I</b>
<b>CSS.06.21</b>	Spatial Data Import and Export	The system shall provide the capability for importing and exporting spatial data in both vector and raster formats. This functionality shall include the ability to add new editable vector layers as well as new raster layers such as orthophotos, satellite imagery, geotagged photographs, etc.	<b>M</b>
<b>CSS.06.22</b>	Technical Support Module	The system must provide the capability for real-time remote support to operators from the regional units of MAFWE, allowing the central LPIS office to take control of the user's session (similar to TeamViewer, AnyDesk, or UltraViewer).  If the implementation of this remote support capability requires the use of commercial APIs or components subject to licensing, the Supplier shall include all necessary licenses in the offer and ensure their validity for a warranty period of two	<b>M</b>

		(2) years, starting from the date of Final System Acceptance Report.	
<b>CSS.06.23</b>	Topological Validation Module	The system shall provide systematic validation of the topological business rules for the reference parcel layer and the physical boundary layer, in cases where the following topological errors are detected: overlaps, kick-back angle, kick-back distance, spike angle, spike distance, minimum polygon area, minimum segment length, maximum sliver area, minimum line length, minimum point distance, etc.	<b>M</b>
<b>CSS.06.24</b>	LPIS Update Module	This module will serve as a main software tool for managing the LPIS update using updated aerial imagery, satellite images, geotagged photos, on-the-spot control results, Controls with Remote Sensing (CwRS) results. New information which can lead to the LPIS update can come from two different sources: New digital orthophoto layer/Satellite imagery/Geotagged photos; Information from on-the-spot controls of the farmer's subsidy applications performed by the Paying agency (Classical on the spot controls using GPS for area measurement and CwRS using satellite images for area measurement).	<b>M</b>
<b>CSS.06.25</b>	Tool for access the LPIS/FR database for update purposes	Data that needs to be periodically updated is usually related to crop list from Permanent Crop Registry where operations like updating of current data or adding new data of variety and type of crops (permanent crops) must be supported. Also this tool must support above mentioned operation in other drop down menus or list of attributes that are frequently used by the operators such as data from the attribute table of the LPIS SW application (list of fields: "Land use", "Prevailing/Dominant Land Use" , "Changed Border", "Invisible Border", "Landscape Features", "Eligibility coefficient" etc.)  The tool must be easy to use (beginners friendly) and to have restriction as read only regarding the access to the rest of the data from the LPIS/FR database.	<b>M</b>
<b>CSS.06.26</b>	Module for continuous LPIS Quality assurance and Quality control	Integration of this module must be implemented by the contractor with previously updating/upgrading the LPIS database model/structure, including the links to related registers, databases, information systems and needed SW application changes which shall be	<b>M</b>

		<p>made in the current database and LPIS SW application.</p> <p>This module must support at least the following activities:</p> <ul style="list-style-type: none"> <li>• Quality checks of delivered spatial data (raster or vector data);</li> <li>• Quality checks of selected samples of LPIS data;</li> <li>• Supervision of staff responsible for LPIS update;</li> <li>• 4 eye control;</li> </ul>	
<b>CSS.06.27</b>	Creation of functionality for geometric (GIS) overlapping between LPIS parcels and Cadastral parcels	For the purpose of keeping LPIS parcels updated in terms of property and ownership rights there is a need of creation of web service in order to be integrated LPIS with cadastral data from the Agency for Real Estate Cadastre (AREC). Received cadastral data from AREC should be overlapped with LPIS parcels and attribute data for cadastral parcels from FR and using this algorithm results as geographic position, shape and area must be created/calculated from the defined overlap. The results which must be shown in the LPIS application should be in geographic (GIS) and attribute form in separate table and shown on the LPIS map. Update of the overlapped parcels (LPIS and Cadastral) should be each time when new data is imported/updated from AREC, algorithm should immediately calculate new position, shape and area of the overlap and update the results in the separate table and shown on map.	<b>M</b>
<b>CSS.06.28</b>	Report Creation tool	<p>The tool must support creation of predefined reports as well as opportunity to create new reports through beginners friendly query builder.</p> <p>Proposed technical design and specifications for upgrading the LPIS by the Contractor shall be in agreement with MAFWE.</p>	<b>M</b>
<b>CSS.06.29</b>	Business rules	System must support implementing Business rules related to “Overlap” – overlap between two LPIS parcels, “Common land use” represents common use and management of a single agriculture parcel by several farm holding; “Pro-rata” - European Union member states may use a pro rata system to calculate payments for permanent pastures that contain non-grazing features.	<b>M</b>
<b>CSS.06.30</b>	Search tool	The system should support searching by all parameters (attributes) of different graphic layers	<b>M</b>

		used in the LPIS, including the cadastral parcel layer (location of cadastral parcel).	
<b>CSS.06.31</b>	LPIS Viewer	<p>The viewer shall be publicly accessible in a web environment for external users who will need to authenticate and authorize themselves to access only their parcels.</p> <p>The viewer shall display the spatial (graphical) and attribute data of the reference layer, with the ability to search by several parameters (e.g., parcel ID, agricultural holding ID, coordinates, etc.).</p>	<b>M</b>

### 2.5.1.2.2.3. Agricultural Cooperatives Monitoring Module

#### Module Overview and Objectives

The **Agricultural Cooperatives Monitoring Module** represents a dedicated component of the Integrated Agricultural Information Platform (IAIP) designed to strengthen the institutional framework for managing, monitoring, and supporting agricultural cooperatives and producer organizations across the country. The establishment of this module reflects the strategic priority of MAFWE to promote collective action, improve market access, and enhance the competitiveness of farmers through better organization and professionalization of cooperatives.

The module builds upon the foundations of a monitoring system developed under the **EU-funded project “Support for the Development of Agricultural Cooperatives” (IPA II)**, which aimed to improve the productivity and competitiveness of the agricultural sector by creating favorable conditions for the development of existing and new cooperatives. The original system enabled the collection of data on cooperatives and their members, the tracking of financial and operational results through performance indicators, and the assessment of the effectiveness of national support measures. It also provided tools for monitoring the economic activity of cooperatives, evaluating their use of financial support programs, and facilitating information exchange between MAFWE and the cooperatives themselves.

After being officially handed over to MAFWE in 2021 and hosted on the Ministry’s servers, the system became temporarily non-functional following the 2022 cyberattack on MAFWE’s IT infrastructure. Since then, the Ministry has initiated activities to restore the system by re-establishing its virtual environment, reinstalling the core application and database components, and preparing for its upgrade with additional functionalities. The planned improvements include the integration of data on **Producer Organizations**, expanded financial and operational indicators, and the inclusion of new monitoring features aligned with EU market organization frameworks.

Within the IAIP, the Agricultural Cooperatives Monitoring Module will serve as a sector-specific digital registry providing structured and reliable data on the status, membership, governance, and performance of agricultural cooperatives. It will also enable the systematic calculation and visualization of indicators relevant for assessing their contribution to rural development and for evaluating the impact of national and EU-funded support measures.

Interoperability with other IAIP components — particularly the **Farm Register** and systems managed by **AFSARD** — will allow the exchange of data for verifying membership, eligibility, and participation in support schemes. Through this interconnection, MAFWE will gain an

improved evidence base for policy formulation, performance monitoring, and reporting to national and international stakeholders.

The module will also support the generation and regular update of key indicators related to rural development, agricultural organization, and competitiveness. These include the number of registered and active agricultural cooperatives by sector and region, the number of members per cooperative and their distribution by type of holding, the annual turnover and value of marketed production through cooperatives, and the level of employment they generate. Additional indicators will measure the extent to which cooperatives and producer organizations utilize national and EU support measures, as well as changes in their economic performance following public support. Through integration with the Farm Register, the system will also provide inputs for estimating the share of cooperative members in the total number of registered farms, while interoperability with AFSARD data will enable monitoring of their participation in payment and support schemes. Together, these indicators will enable MAFWE to assess the effectiveness of support policies and to track the overall contribution of agricultural cooperatives to rural employment, market access, and competitiveness within the agri-food sector.

By restoring and modernizing this system as part of the IAIP, MAFWE will re-establish an essential digital tool for the long-term monitoring and institutional strengthening of agricultural cooperatives, thereby supporting a more sustainable, inclusive, and competitive agricultural sector.

#### **Agricultural Cooperatives Monitoring Module – Detailed Requirements**

<b>Number</b>	<b>Process</b>	<b>Feature</b>	<b>Type</b>
<b>CSS.07.01</b>	Registration and record management	The application shall support the registration and maintenance of agricultural cooperatives, including data such as name, registration number, address, activity sector, establishment date, and operational status.	<b>M</b>
<b>CSS.07.02</b>	Registration of producer organizations	The system shall enable the management of producer organizations, recording information on purpose, activity sector, membership structure, and operational programs.	<b>M</b>
<b>CSS.07.03</b>	Membership management	The module shall maintain detailed information on cooperative members and establish a direct linkage with entities registered in the Farm Register for verification and reporting purposes. IDBR shall be used as the linking parameter between FR and Agricultural Cooperatives Monitoring Module	<b>M</b>
<b>CSS.07.04</b>	Management of agricultural holdings that are members of agricultural cooperatives.	The Agricultural Cooperatives Monitoring Module shall maintain comprehensive records for each agricultural holding. The dataset shall include, at a minimum, the following attributes: <ul style="list-style-type: none"> <li>• General information: Name, Unique Farm Identifier (IDBR), Address, Region, and Holding Owner.</li> </ul>	<b>M</b>

		<ul style="list-style-type: none"> <li>• Land and production: Total agricultural land (ha) owned or under use rights; annual production quantities per crop (both conventional and organic); crop yields per unit area.</li> <li>• Market information: Average selling price per crop (conventional and organic), sales volumes on domestic and export markets.</li> <li>• Livestock and apiculture: Number of livestock and beehives owned by the holding;</li> <li>• Financial support: Direct payments per crop/measure and any grants or other types of assistance;</li> <li>• Perennial crops: Description and type of plantation (e.g., vineyards, orchards) and year of establishment;</li> <li>• Machinery: Type, power (kW), and year of manufacture;</li> <li>• Irrigation: Source and system type by covered area;</li> <li>• Total cultivated area (ha).</li> </ul> <p>The module shall ensure data consistency, support analytical reporting by crop type and region, and allow integration with other IAIP components (e.g., land management, subsidies, and production monitoring modules).</p>	
<b>CSS.07.05</b>	Governance and management structure	The application shall record data on governing bodies, management boards, and authorized representatives, ensuring up-to-date contact and decision-making information.	<b>M</b>
<b>CSS.07.06</b>	Financial and operational performance	The system shall allow entry and management of financial and operational data, including turnover, assets, liabilities, production volumes, and employment, as a basis for performance assessment.	<b>M</b>
<b>CSS.07.07</b>	Monitoring of support programs	The module shall provide functionality for recording and analyzing participation of cooperatives and producer organizations in national and EU support schemes, including the type and value of support received.	<b>M</b>
<b>CSS.07.08</b>	Indicators for measuring the performance results	The Performance and Analytical Indicators Module shall enable monitoring, analysis, and visualization of quantitative and qualitative	<b>M</b>

	of agricultural cooperatives	<p>indicators related to agricultural holdings and cooperatives.</p> <ol style="list-style-type: none"> <li><b>1. Indicator Types:</b> <ul style="list-style-type: none"> <li>• Absolute number (raw value);</li> <li>• Percentage change compared to the previous period (growth, decline, stagnation);</li> <li>• Ratio between two indicators (e.g., profit vs. revenue, male vs. female members);</li> <li>• Temporal trends over defined time periods.</li> <li>• Progress rate (% of target achievement).</li> </ul> </li> <li><b>2. Indicators for Agricultural Holdings:</b> <ul style="list-style-type: none"> <li>• Production trend (annual increase/decrease by crop);</li> <li>• Yield-to-machinery-use ratio per cooperative (efficiency index).</li> </ul> </li> <li><b>3. Indicators for Agricultural Cooperatives:</b> <ul style="list-style-type: none"> <li>• Demographic indicators: average age of members, age structure trend, percentage of young farmers (under 40), and gender balance (women/men);</li> <li>• Leadership indicators: percentage of female managers (female-to-male ratio);</li> <li>• Structural indicators: number of members, membership growth trend, newly established cooperatives, total number per region, and classification by main activity;</li> <li>• Economic indicators: annual turnover (gross profit) trends, net profit margin (profit-to-revenue ratio), and production capacity increase (% in land, machinery power, processing output, storage capacity, and employment);</li> <li>• Market indicators: sales volumes and values on domestic vs. export markets;</li> <li>• Irrigation indicators: irrigated area by irrigation type and trend over time;</li> <li>• Knowledge and innovation indicators: trends in seminar attendance and certificates obtained.</li> </ul> </li> <li><b>4. Cross-cutting Indicators:</b></li> </ol>	
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		<ul style="list-style-type: none"> <li>• Share of farmers who are cooperative members compared to the total number of farmers in the country;</li> <li>• Education level trends within cooperatives (formal and non-formal).</li> </ul> <p>The IAIP shall provide configurable dashboards and analytical tools to visualize these indicators across multiple dimensions (e.g., by year, region, crop type, cooperative) and to export summarized results for policy analysis and reporting.</p> <p>A designated subset of these dashboards shall be made publicly accessible via external web access, subject to applicable data protection, confidentiality, and access-to-information regulations. The Ministry shall retain the exclusive right to determine the scope, level of aggregation, and specific data elements to be disclosed to the public, in full compliance with the relevant legal framework.</p>	
<b>CSS.07.09</b>	Indicator calculation	The application shall automatically calculate predefined indicators related to cooperative performance, participation in support measures, and contribution to rural development.	<b>M</b>
<b>CSS.07.10</b>	Integration with Farm Register	The system shall exchange and cross-reference data with the Farm Register to verify cooperative membership and to ensure consistency of identifiers and holding information.	<b>M</b>
<b>CSS.07.11</b>	Interoperation with AFSARD and policy modules	The application shall support data exchange with AFSARD systems and policy analysis modules for monitoring financial support impact and program efficiency.	<b>M</b>
<b>CSS.07.12</b>	Reporting and analytics	The module shall provide analytical dashboards and customizable reports by year, region, and sector, including trend visualization and export functions (PDF, Excel).	<b>M</b>
<b>CSS.07.13</b>	Migration and restoration of legacy system	The system shall include functionality for migration and restoration of data from the previous Monitoring of Agricultural Cooperatives application, ensuring data integrity and backward compatibility.	<b>M</b>

CSS.07.14	Legal and policy compliance	The module shall enable monitoring of compliance with legal requirements for cooperative registration and operation, generating alerts and summary reports on irregularities.	M
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#### 2.5.1.2.2.4. ISET Module

##### Module Overview and Objectives

The **Integrated System for Tobacco Record-Keeping (ISET)** is the central information system for recording, monitoring, and administering tobacco production, trade, and related support measures in the Republic of North Macedonia. Its primary objective is to provide transparent and accurate management of the tobacco value chain — from contracted production and cultivated areas to procurement, purchase records, and payment of subsidies.

The system enables registration of **tobacco producers** and **purchasers**, as well as the recording of declared and realized quantities, varieties, and grades of tobacco for each harvest. It also supports monitoring of purchase contracts, deliveries, and payments through licensed buyers, ensuring full traceability and compliance with national legislation and EU market regulations.

Within the **Integrated Agricultural Information Platform (IAIP)** ISET will operate as a **specialized sectoral module** interoperable with the **Farm Register (FR)**, **Land Parcel Identification System (LPIS)** and **State-owned Agricultural Land Management System (SALMIS)**, while also exchanging data with the **Register of Buyers** and the **Payment System** managed by AFSARD. The system shall be technically prepared to exchange data with other institutions that require access to or provision of tobacco-related information, by exposing standardized services accessible through the **National Interoperability Platform (NIP)**. The development of specific integrations with external institutional systems shall not be part of the Supplier’s obligations under this Contract, unless explicitly defined during the implementation phase based on MAFWE’s requirements.

The registers maintained within ISET represent a **single source of truth** for actors, products, and trade flows within the tobacco sector. They enable automatic calculation of operational indicators (e.g. number of purchasers, exporters/importers, brands in circulation, contracted vs. realized quantities, and compliance deadlines). ISET contributes to the IAIP **Monitoring and Evaluation (M&E)** framework both **directly**—through indicators such as **I-R8** (participation in schemes and local markets)—and **indirectly**—through validation and cross-referencing with foreign trade data related to indicator **I-I3** (agricultural imports and exports).

The system to be developed under this Project shall provide a modular architecture that allows future upgrades and extensions in line with evolving legislation, audit recommendations, or process optimization needs. Any legal or regulatory changes affecting data scope or structure prior to implementation will be incorporated during the business analysis phase.

The migration of existing ISET data to the new IAIP environment shall follow the procedures described in **Section 2.5.2. (Data Conversion and Migration)** and the specifications in **Annex A – Analysis of Existing IT Solutions**. All data shall be transferred **as-is**, preserving all records and historical datasets. The Supplier shall verify data integrity, completeness, and format consistency without modifying or interpreting the original data.

The modernization of ISET within the IAIP will enhance data integrity, reduce administrative burden for producers and institutions, and strengthen oversight of the tobacco sector – ensuring transparency, traceability, and alignment with EU agricultural policy requirements.

The following section presents the **detailed functional requirements** for the ISET module, defining the processes, data structures, and integrations that must be implemented or upgraded within the new IAIP framework.

### ISET Module – Detailed Requirements

Number	Process	Feature	Type
<b>Registration and Master Data</b>			
<b>CSS.08.01</b>	Registration of tobacco purchasers	Enables creation, update, and management of tobacco purchasers with all legally required attributes (tax ID, registry number, decision dates, status, prohibition/deletion entries).	<b>M</b>
<b>CSS.08.02</b>	Registration of purchase centers	Allow purchasers to enter and maintain purchase center data (Unique ID of the purchase center – automatically generated by the system, name, municipality, address, ownership, number of scales). Accessible for MAFWE/SIA (State Inspectorate for Agriculture) overview.	<b>M</b>
<b>CSS.08.03</b>	Purchaser bank guarantees	Enables SIA to record, verify, and upload scanned bank guarantees linked to purchasers, with automatic validity monitoring.	<b>M</b>
<b>CSS.08.04</b>	Management of tobacco types and varieties	Central codebook for tobacco types, varieties, and grades, managed centrally by MAFWE, synchronized across all modules.	<b>M</b>
<b>Contracting and Declaration</b>			
<b>CSS.08.05</b>	Import of declared production from Farm Register	Purchasers preview declared tobacco areas and quantities directly from FR (via interoperability services).	<b>M</b>
<b>CSS.08.06</b>	Contract registration between purchasers and producers	Enables purchasers to record contract details per harvest: producer, parcel, type/variety, agreed quantity, and price.	<b>M</b>
<b>CSS.08.07</b>	Contract confirmation	System generates and prints confirmation for both parties with unique number (IDBR) and QR code linking to electronic record.	<b>M</b>
<b>CSS.08.08</b>	Change of contract holder	Provides workflow to transfer contract ownership with validation and MAFWE notification.	<b>M</b>
<b>Purchase and Processing</b>			
<b>CSS.08.09</b>	Recording of daily purchases	Purchasers enter daily quantities, grades, and prices; system validates totals and calculates averages.	<b>M</b>

<b>CSS.08.10</b>	Dispute (complaint) book	Purchasers record complaints with full details of disputed lots, deduction reasons, and resolution status.	<b>M</b>
<b>CSS.08.11</b>	Purchase receipts and daily statements	Automatic generation of signed receipts (producer + purchaser) with QR link to contract record.	<b>M</b>
<b>CSS.08.12</b>	Monthly tobacco processing records	Entry of processed and purchased tobacco per type, month, and harvest. Includes “kalo” losses and totals.	<b>M</b>
<b>CSS.08.13</b>	Auto-check of bank guarantee consumption	System automatically deducts value of purchased tobacco from active bank guarantee; issues alert when depleted.	<b>M</b>
<b>Data Validation, Control, and Reporting</b>			
<b>CSS.08.14</b>	Validation and duplicate prevention	Mandatory data validation for parcels, contracts, IDs, and quantities. Duplicate entries prevented.	<b>M</b>
<b>CSS.08.15</b>	Dashboards for oversight institutions	Real-time dashboard for MAFWE, SIA, and AFSARD with KPIs on contracts, purchases, and quantities.	<b>M</b>
<b>CSS.08.16</b>	Real-time analytical reports	Reports on purchases, disputes, and processed quantities by region, harvest, and purchaser.	<b>M</b>
<b>CSS.08.17</b>	Data export	Export to standard formats (CSV/XLS/PDF) and data feed for IAIP/BI module.	<b>M</b>
<b>CSS.08.18</b>	Notifications and reminders	Alerts for missing submissions, expired guarantees, and unclosed purchase periods.	<b>P</b>
<b>CSS.08.19</b>	Maker-checker workflow	Two-step approval for data corrections or amendments.	<b>M</b>
<b>CSS.08.20</b>	Audit log and traceability	Full audit trail for data creation, updates, and deletion.	<b>M</b>
<b>Interoperability and Migration</b>			
<b>CSS.08.21</b>	Integration with Farm Register and LPIS	Cross-verification of parcels and producers through the National Interoperability Platform (NIP).	<b>M</b>
<b>CSS.08.22</b>	Interoperation with Payment System (AFSARD)	Automated data exchange on purchased quantities and prices per harvest.	<b>M</b>
<b>CSS.08.23</b>	APIs for institutional interoperability	The IAIP will expose standardized APIs (via NIP) for authorized institutions needing access to tobacco data. Supplier is not required to implement external integrations.	<b>M</b>
<b>CSS.08.24</b>	Migration of existing ISET data	Legacy data shall be migrated as-is, without content correction.	<b>M</b>

<b>CSS.08.25</b>	Read-only access to legacy ISET system	Suppliers will be provided with read-only credentials for analysis and migration preparation.	<b>I</b>
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### 2.5.1.2.2.5. Agricultural Products Buyers Module

#### Module Overview and Objectives

The Agricultural Products Buyers Module serves as the central register and monitoring tool for entities engaged in the purchase of agricultural products. Its primary objective is to ensure transparent, fair, and traceable transactions between producers and buyers, while providing MAFWE with accurate data to support policy implementation, compliance verification, and market oversight.

The module enables the **registration and licensing of buyers**, evidence of **procurement contracts**, reporting of **purchased quantities**, and verification of **deliveries declared under agricultural support schemes** (e.g., realized production in crop, fruit, milk, and tobacco sectors). It also provides a reliable administrative and analytical basis for cross-checking declared production against realized sales and payments.

MAFWE currently operates an existing system for registering buyers of agricultural products, which will be reengineered and technologically upgraded as part of the IAIP implementation. The upgraded register will serve as an official and continuously updated record of all legal entities authorized to conclude purchase contracts and carry out procurement activities under the prescribed conditions. It will act as a **“single source of truth”** regarding the legitimacy, authorization, and operational capacity of buyers, providing information on their status, purchase locations, and activities.

Within the IAIP, the module will operate as a core transactional and control component for monitoring the purchase and marketing of agricultural products. It will be fully interoperable with the Farm Register (FR) and the Land Parcel Identification System (LPIS) to enable verification of producers, parcels, and declared production, and will exchange data with the ISET module and the Payment System managed by AFSARD. Through these integrations, the system will support cross-checks between declared production, contractual purchases, and realized payments, ensuring traceability, regulatory compliance, and reliable data for policy monitoring and reporting.

The module will contribute indirectly to the **Monitoring and Evaluation (M&E)** indicators defined in Section 2.7, primarily through validation and establishment of reliable denominators for:

- **I-R8** – participation of farms in quality schemes, local markets, or short supply chains (via organized purchase arrangements and contract types);
- **I-I3** – import/export impact (when registered buyers also act as importers/exporters, enabling cross-checks with customs statistics).

Additionally, the system will enable the automatic calculation of key operational KPIs, including:

- Number and dynamics of active buyers;
- Geographic distribution and coverage of purchase centers;
- Timeliness of monthly reporting and compliance with statutory deadlines;
- Contracted vs. realized quantities;

- Amount and frequency of payments.

The modernization of the existing solution within the IAIP framework will improve data consistency, interoperability, and traceability, reduce administrative burden for both producers and buyers, and enhance transparency and efficiency in the agricultural products market.

The migration of data from the existing Buyer Register to the new IAIP module shall be performed **as-is**, without modification or correction of content, ensuring full integrity and continuity of historical records.

The following section defines the detailed **functional requirements** for the Agricultural Products Buyers Module, covering registration, contract management, data validation, control, and reporting functionalities.

### Agricultural Products Buyers Module – Detailed Requirements

Number	Process	Feature	Type
<b>Registration and Master Data</b>			
<b>CSS.09.01</b>	Role-based access and user groups	Provides access for MAFWE users, registered buyers, the State Inspectorate for Agriculture (SIA), and AFSARD. Access is role-based, with permissions for registration, data entry, oversight, and reporting.	<b>M</b>
<b>CSS.09.02</b>	Register of buyers	Maintains official records of legal entities engaged in agricultural product purchase, including legal name, tax number (EDB), activity code, registration decision/date, type of purchaser (processor/trader), and purchase locations. Includes history of changes and an archive of deleted records.	<b>M</b>
<b>CSS.09.03</b>	Product group management	Allows assigning permitted product groups (e.g., cereals, tobacco, milk, meat, grapes, fruits, vegetables, honey, flowers) to each buyer, based on their approved activities. Validated product list is applied in contracts and purchase records.	<b>M</b>
<b>CSS.09.04</b>	Management of purchase centers	Enables creation and maintenance of approved purchasing locations/centers per buyer, including details about the location, ownership, and an inspection report from the State Agricultural Inspectorate confirming the availability of required purchasing equipment and financial resources (e.g., scales, bank guarantee).	<b>M</b>
<b>Contracting and purchasing</b>			
<b>CSS.09.05</b>	Contract management	Enables creation and registration of contracts between producers and buyers (or between traders/processors), specifying product group, quantity, and price per unit.	<b>M</b>

<b>CSS.09.06</b>	Recording of purchase transactions	Records each purchase with unique identifier, producer ID, product type/class, location, quantity (kg), price/kg, and total payment amount. Includes timestamps and automatic status tracking.	<b>M</b>
<b>CSS.09.07</b>	Prices and payments	Records payment details (price/kg, total value, payment confirmation/date), editable only during designated workflow phases.	<b>M</b>
<b>CSS.09.08</b>	Workflow control	Implements action for buyers to submit completed purchase data, after which the record becomes locked for editing (except payment fields) until finalized.	<b>M</b>
<b>CSS.09.09</b>	Contract type and category handling	Supports distinction between contract types (onward sale vs. direct purchase) and, for specific products (e.g., apples), table vs. industrial categories, enforcing business rules and separate reporting.	<b>M</b>
<b>Validation and Compliance Control</b>			
<b>CSS.09.10</b>	Compliance control against contract	Verifies that each purchase record corresponds to a valid contract and stays within contractual limits for type, quantity, and period.	<b>M</b>
<b>CSS.09.11</b>	Product and type code lists	Provides standardized code lists for products and types, ensuring controlled selections (drop-down menus) and input validation.	<b>M</b>
<b>CSS.09.12</b>	Data validation rules	Enforces validation of all input data against predefined business rules – mandatory fields, logical dependencies, and valid ranges – before record submission.	<b>M</b>
<b>CSS.09.13</b>	Traceability and linkage	Ensures traceability from contract → purchase → processing/exporting, supporting reporting on product origin and flow.	<b>M</b>
<b>CSS.09.14</b>	Compliance notifications	Generates automatic alerts for validation errors, deadline breaches, or missing monthly submissions.	<b>M</b>
<b>Monthly Reporting and Oversight</b>			
<b>CSS.09.15</b>	E-notice for start of purchase	Allows buyers to submit an electronic notice of intended purchase activity at least 30 days before start, including buyer info, approved location, and planned start date. Automatically verified and routed to SIA/MAFWE.	<b>M</b>
<b>CSS.09.16</b>	Monthly data submission and closure	Requires buyers to submit realized monthly data (previous month) and planned quantities for the next month by the 15th of each month.	<b>M</b>

		Includes automated validation, timestamp, and closing confirmation.	
<b>CSS.09.17</b>	Automatic reminders	Sends system reminders to buyers who have not submitted daily and monthly data or who failed validation checks.	<b>M</b>
<b>CSS.09.18</b>	Archive of deleted buyers	Transfers deleted buyer records to a separate, read-only archive register with full metadata (deletion reason/date, authorized decision)	<b>M</b>
<b>Reporting and Institutional Access</b>			
<b>CSS.09.19</b>	Reports for MAFWE and SIA	Provides analytical reports by buyer, region, product, and contract type. Includes daily, monthly and annual reports on purchased and paid quantities.	<b>M</b>
<b>CSS.09.20</b>	Reports for AFSARD	Generates standardized datasets and reports for AFSARD on daily, monthly and annual purchase volumes, by buyer and product type.	<b>M</b>
<b>CSS.09.21</b>	Role-based dashboards	Displays summary KPIs (number of active buyers, purchase centers, contract compliance, submission timeliness, quantities purchased).	<b>M</b>
<b>Interoperability and Migration</b>			
<b>CSS.09.22</b>	Interoperability with IAIP and external systems	Provides interoperability with FR, LPIS, ISET, AMIS, Food Operators Register and exchange of data with the AFSARD Payment System through the National Interoperability Platform (NIP).	<b>M</b>
<b>CSS.09.23</b>	Migration of existing Buyer Register data	The Supplier shall migrate all existing data <b>as-is</b> , maintaining full integrity and history of records without modification or correction.	<b>M</b>
<b>CSS.09.24</b>	User documentation	Supplier shall deliver separate user guides for MAFWE administrators, buyers, SIA, and AFSARD staff, including process descriptions, role matrices, and annotated screenshots.	<b>M</b>
<b>CSS.09.25</b>	Read-only access to legacy system	Supplier will be provided with read-only credentials for the existing Buyer Register to support analysis, mapping, and migration preparation.	<b>I</b>

#### **2.5.1.2.2.6. Organic Production Module**

##### **Module Overview and Objectives**

The Organic Production module (OPM) represents one of the key components of the Integrated Agricultural Information Platform (IAIP) that supports the administration, monitoring, and control of organic agriculture in the Republic of North Macedonia, in line with the Law on Organic Production and its implementing by-laws. The module enables comprehensive

management of all entities and processes related to organic production — including operators, control bodies, certification workflows, and authorized materials — ensuring transparency, traceability, and compliance with EU organic production standards.

By maintaining verified data on certified operators, production areas, control bodies, and certification activities, the Organic Production module strengthens the national capacity for policy implementation, inspection planning, and performance monitoring.

It directly contributes to output indicators I-O3 and I-O4 (number of certified organic operators and total organic area), and result indicators II-R7 and II-R9 (share of agricultural land under organic production and level of compliance with agri-environmental measures).

At the same time, it indirectly supports sectoral structural indicators OP-S01 – OP-S05, which capture the distribution, type, and dynamics of organic production, processing, and certification activities, enabling longitudinal and comparative analysis within the agricultural sector.

The modernization of this system within the IAIP will ensure reliable data exchange, streamlined certification and inspection processes, and evidence-based policy support. The following section presents the functional requirements for the development of the Organic Production module.

### Organic Production Module – Detailed Requirements

Number	Process	Feature	Type
CSS.10.01	Module Scope and Legal Alignment	Implements all registers and processes required by the Organic Production Law: producers, conversion products, processors, organic feed producers, group certification (ICS), control bodies, certificates, non-compliances, allowed substances, organic heterogeneous materials, aquaculture and beekeeping units, authorized inspectors, and annual reports.	M
CSS.10.02	Application Intake – Online and Local Submission	Online submission via eID/SSO with e-signature and attachments; Local MAFWE Offices can enter paper applications.	M
CSS.10.03	Case Registration (SR1 Reference)	Each application linked to SR1 number from first-instance administrative case register.	M
CSS.10.04	Operator Master Data	Unified operator record (producer/processor/feed producer/aquaculture/beekeeper) with EMBG/EMBS, tax ID, contacts, linked control body, and registration status.	M
CSS.10.05	Production Units and Locations	Records units (plots, facilities, apiaries, aquaculture sites) with coordinates; links to LPIS parcels; supports multiple units per operator.	M
CSS.10.06	Products in Conversion	Tracks products/areas in conversion: type, start/end date, surface/quantity, linked operator/unit.	M
CSS.10.07	Processors and Packers Registry	Registry of processors/packers: product categories, process types, facilities, linked certificates.	M
CSS.10.08	Organic Feed Producers Registry	Registry of organic feed producers: feed categories, capacities, facilities, sourcing declarations.	M

<b>CSS.10.09</b>	Group Certification (ICS)	Supports operator groups with Internal Control System: group data, ICS manager, members, internal inspections, certification per member.	<b>M</b>
<b>CSS.10.10</b>	Control Bodies Registry	Registry of authorized control bodies with number, scope, validity, contact, responsible persons, and suspension history.	<b>M</b>
<b>CSS.10.11</b>	Inspector/Controller Authorizations	Registry of authorized inspectors linked to control body, with authorization number, validity, and training info.	<b>M</b>
<b>CSS.10.12</b>	Certificates Registry	Registers certificates with number, operator, scope, validity, status, reason codes, and attached PDF.	<b>M</b>
<b>CSS.10.13</b>	Certificate Lifecycle and Validation	Manages issuance, update, suspension, revocation, renewal; validates certificate uniqueness and linkage.	<b>M</b>
<b>CSS.10.14</b>	Non-Compliance and Measures	Records non-compliances, classification, date, operator, measures, deadlines, and outcomes.	<b>M</b>
<b>CSS.10.15</b>	Allowed Products and Substances	Curated list of allowed substances (fertilizers, plant protection, feed additives) with restricted CRUD.	<b>M</b>
<b>CSS.10.16</b>	Organic Seed/Plant Material & Heterogeneous Material	Registry of organic plant material and heterogeneous material with species, authority, number, origin, validity.	<b>M</b>
<b>CSS.10.17</b>	Aquaculture and Beekeeping Units	Records aquaculture and beekeeping data: species, units/hives, coordinates, certification status.	<b>M</b>
<b>CSS.10.18</b>	Annual Reports from Control Bodies	Submission and consolidation of annual reports: number of controls, certificates, non-compliances, measures, recommendations. System enforces submission deadline by 15 February with automatic alerts for delay.	<b>M</b>
<b>CSS.10.19</b>	Online Evidence and Attachments	Upload supporting documents (agreements, HACCP/IFS, lab analyses). Each operator record must include a valid certificate attachment; central repository with metadata and integrity check.	<b>M</b>
<b>CSS.10.20</b>	Reporting and M&E Indicators	Reports on organic area, operators by region/municipality/crop; time series for certificates and non-compliances. The system shall support calculation and reporting of indicators I-O3, I-O4, II-R7 and II-R9, including gender and age disaggregation where applicable.	<b>M</b>
<b>CSS.10.21</b>	Data Migration (Legacy to IAIP)	Migrate all legacy datasets as-is ensuring completeness/integrity; supports bulk import from structured Excel/CSV templates for initial data load.	<b>M</b>
<b>CSS.10.22</b>	Access to Legacy Organic System (Informative)	The selected Supplier shall be provided with a read-only user account to the existing Organic Production Information System for familiarization with legacy data structures and functionalities. No data modification is allowed under this access.	<b>I</b>

### 2.5.1.2.2.7. AMIS Module

#### Module Overview and Objectives

The Agricultural Market Information System (AMIS) serves as the national platform for collecting, processing, and disseminating data on agricultural markets. Its primary objective is to ensure transparent, timely, and reliable information on prices, quantities, and market movements of agricultural products, thereby supporting evidence-based policymaking and market monitoring by public institutions, while enabling informed business decisions by producers, traders, and consumers.

AMIS enables systematic collection of price and quantity data for key agricultural commodities across wholesale markets, processing facilities, and retail chains. Through unified methodologies for data validation, analysis, and visualization, the system supports monitoring of market trends, seasonal and regional price variations, and the preparation of analytical reports and forecasts. The platform also facilitates automatic data exchange with relevant institutions, ensuring that agricultural market data is harmonized, comparable, and aligned with European and international standards.

Within the IAIP, AMIS will function as an **analytical and reporting module**, interoperable with production and trade registries such as the **Farm Register, Agricultural Products Buyer’s Module, LPIS**, and the **Organic Production Register**. It will also support secure data exchange with the **State Statistical Office (SSO), AFSARD**, and **international organizations** (e.g. Eurostat, FAO), to fulfil regular reporting obligations and policy performance assessments.

By aligning with European and international models for agricultural market information systems, AMIS will contribute to increased **transparency, stability, and competitiveness** of the agricultural sector. It will provide public access to market data and analytical summaries, supporting not only farmers and buyers but also researchers, policymakers, and the general public through the publication of up-to-date reports and interactive dashboards.

Within the national **Monitoring and Evaluation (M&E)** framework, AMIS serves as a **key data source** for several performance and impact indicators defined in Section 2.7.3 of this specification. Specifically, it supports:

- **Output indicators** (I-O1 to I-O4) related to the number of beneficiaries, supported production volumes, and direct payment dynamics;
- **Result indicators** (I-O5 to I-O16) covering investments, market participation, infrastructure, and producer organizations; and
- **Impact indicators** (II-O1 to II-O5) related to climate resilience, organic production, and Good Agricultural Practices (GAP).

The modernization of AMIS as part of the IAIP will significantly improve data quality, automation of market data flows, and accessibility of market intelligence, ensuring that policymakers, institutions, and private stakeholders benefit from a single, authoritative, and data-driven agricultural market information system.

#### AMIS Module – Detailed Requirements

Number	Process	Feature	Type
<b>User and System Administration</b>			
<b>CSS.11.01</b>	Role-based access control	Enables role-based access for defined user profiles (Guest, Reporter, Manager,	<b>M</b>

		Administrator), with configurable permissions for data entry, approval, publication, and reporting.	
<b>CSS.11.02</b>	Administration console	Provides a centralized interface for managing users, permissions, reference data, and configuration of reports and dashboards.	<b>M</b>
<b>CSS.11.03</b>	Audit trail and versioning	Maintains a full history of transactions and configuration changes, including user ID, timestamp, and operation type.	<b>M</b>
<b>Data Collection and Validation</b>			
<b>CSS.11.04</b>	Product and market registry	Enables creation and maintenance of reference tables for agricultural products, market locations, and categories, synchronized with external authoritative lists (e.g. SSO product nomenclature).	<b>M</b>
<b>CSS.11.05</b>	Data entry and validation forms	Provides structured forms for entering price and quantity data, ensuring validation against predefined business rules (mandatory fields, value ranges, data type checks, and logical consistency) before submission.	<b>M</b>
<b>CSS.11.06</b>	Data approval workflow	Implements an approval process where submitted data can be reviewed, approved, or rejected prior to publication or inclusion in official reports.	<b>M</b>
<b>Data Processing and Analytics</b>			
<b>CSS.11.07</b>	Analytical dashboards and reports	Generates predefined and ad-hoc analytical outputs, including tables and charts showing market trends, regional comparisons, and time-series dynamics.	<b>M</b>
<b>CSS.11.08</b>	Dynamic report designer	Enables authorized users to design custom report templates and dashboards through a user-friendly interface, without developer intervention.	<b>P</b>
<b>CSS.11.09</b>	Statistical tools	Provides functions for time-series analysis and calculation of statistical averages.	<b>P</b>
<b>Integration and Interoperability</b>			
<b>CSS.11.10</b>	Interoperability with external systems	Exposes secure APIs for data exchange with other IAIP internal modules (FR, LPIS, ISET, Organic Production, Agricultural Products Buyers), external systems (SSO and AFSARD via the National Interoperability Platform) and the systems of international organizations (e.g. Eurostat, FAO etc.).	<b>M</b>

<b>CSS.11.11</b>	Migration of existing AMIS data	The Supplier shall perform the migration of all existing AMIS datasets as-is, ensuring full data integrity, structure preservation, and continuity of historical time series. No correction or modification of content is required.	<b>M</b>
<b>CSS.11.12</b>	Secure connectivity	Ensures encrypted communication between distributed users and the central database using standard HTTPS/TLS protocols.	<b>M</b>
<b>Communication, Notifications and Support</b>			
<b>CSS.11.13</b>	Notification and alert service	Provides configurable alerts for validation issues, submission deadlines, or workflow events via email or dashboard widgets.	<b>M</b>
<b>CSS.11.14</b>	Content management and publication	Enables authorized users to create and manage informational pages, news, and visual content for public dissemination through an integrated CMS.	<b>P</b>
<b>CSS.11.15</b>	Error monitoring	Logs operational errors and exceptions with unique identifiers, accessible to system administrators for troubleshooting.	<b>M</b>
<b>CSS.11.16</b>	Help and documentation	Includes online manuals, tutorials, and contextual help accessible from each module.	<b>M</b>
<b>CSS.11.17</b>	Read-only access to legacy AMIS	The Supplier will be provided with read-only credentials for the existing AMIS system to support analysis, data mapping, and migration preparation.	<b>I</b>

### 2.5.1.2.3. SALMIS module

#### Positioning of SALMIS within the Integrated Agricultural Information Platform

The SALMIS module is designed and implemented as an integral functional component of the Integrated Agricultural Information Platform (IAIP). As such, SALMIS does not operate as a standalone system, but relies on and utilizes a set of shared, platform-level services and infrastructural capabilities provided centrally by IAIP.

These shared services include, but are not limited to:

- centralized user authentication and authorization mechanisms (including integration with the national Single Sign-On system where applicable);
- audit logging and traceability of user actions and data changes;
- notification and alerting services;
- interoperability and data exchange mechanisms with external institutions via the National Interoperability Platform (NIP) or purpose-built APIs;
- reporting, analytics, and dashboarding services; and
- common security, data protection, and operational monitoring controls.

Within this architecture, SALMIS is responsible for implementing domain-specific business logic, workflows, data models, and GIS functionalities related to the management of state-owned agricultural land and pastures. In doing so, SALMIS shall operate in alignment with the national interoperability, spatial data, and information security frameworks applicable to IAIP, including requirements related to the National Interoperability Platform and the National Spatial Data Infrastructure.

SALMIS shall also support the activities of authorized inspection bodies, in particular the State Agricultural Inspectorate (SAI), by providing access to authoritative land management data, geospatial visualization, and interoperable services, including through web and mobile-enabled interfaces where appropriate. Such support shall be limited to data provision and technical enablement, and SALMIS shall not replace, duplicate, or assume the functions of existing inspection or enforcement information systems, which remain under the responsibility of the SAI in accordance with its legally defined mandate.

All functional requirements defined in the following sections describe the mandatory capabilities of the SALMIS module itself, while assuming the availability and proper functioning of the shared IAIP services defined elsewhere in this document.

Accordingly, requirements related to platform-level services are specified in the relevant IAIP sections of this document and are referenced by SALMIS only where needed for completeness.

## **Module Overview and Objectives**

Within the framework of the ongoing modernization and digital transformation of the agricultural sector, the Ministry of Agriculture, Forestry and Water Economy (MAFWE) currently utilizes two temporary information systems to support the preliminary collection and structuring of data related to state-owned agricultural land. These systems comprise a Temporary Inventory application, used for recording and maintaining alphanumeric data on lease contracts for arable agricultural land and contracts for the use of state-owned pastures, and a Temporary Graphical (geospatial) application, used for uploading and processing geodetic elaborates for the purpose of generating an initial graphical representation of leased state-owned agricultural land and pastures.

These systems have been established as interim and transitional solutions. Their scope and functionality are limited to enabling the initial consolidation and preparation of data during a temporary phase and they are not intended to operate as permanent production systems. As such, they do not provide full support for end-to-end business processes, long-term operational requirements, advanced data governance, or systematic interoperability with other national information systems.

The State Agricultural Land Management Information System (SALMIS) is envisaged as one of the core functional modules of the future Integrated Agricultural Information Platform. SALMIS is intended to constitute the permanent, authoritative, and production-level system for the management of state-owned arable agricultural land and pastures. Upon its implementation, SALMIS shall fully replace the existing temporary applications and shall ensure integrated management of alphanumeric and geospatial data within a unified system architecture. SALMIS shall act as the authoritative source of record for data related to state-owned agricultural land and pastures, ensuring legal certainty, data integrity, and full traceability across all related business processes and external data exchanges.

All data currently maintained within the Temporary Inventory application and the Temporary Graphical application shall be subject to validation, consolidation, and migration into SALMIS

in accordance with defined migration procedures, after which the temporary solutions shall be formally phased out.

The current state of the existing IT environment within MAFWE, including the scope, purpose, limitations, and interdependencies of the temporary systems, is described in detail in Annex A – Analysis of Existing IT Solutions at MAFWE. This annex provides the baseline assessment of the existing situation and constitutes the analytical foundation for defining the scope, role, and functional expectations of the SALMIS module within the integrated platform. Furthermore, the methodology governing the creation, validation, and maintenance of geospatial data related to leased state-owned agricultural land, including the use of geodetic elaborates, is defined in Annex C – Methodology for Creation of Geospatial Data on Leased Agricultural Land.

The functional and technical requirements for the SALMIS module have been defined in accordance with the applicable legal framework in force at the time of preparation of this Technical Specification. However, it is noted that amendments to the Law on Agricultural Land are currently under preparation. In the event that a revised law is adopted during the implementation period or at any time during the duration of the Contract, including the warranty period, the Supplier shall be required to align the SALMIS module with the updated legal provisions. Such alignment shall be carried out within the scope of the Contract and without any change to the Contract price, regardless of whether the resulting adjustments lead to an increase or decrease in the scope of work.

Building upon the assessment of the existing IT landscape and the requirements identified therein, the following sections of this document define the functional requirements for the SALMIS module. These requirements describe the mandatory system functionalities, business processes, data management capabilities, and interoperability mechanisms that SALMIS must support to operate as an integral and sustainable component of the Integrated Agricultural Information Platform.

Functionality related to generic platform services (e.g. identity management, interoperability infrastructure, notification engines, or BI tooling) is not implemented separately within SALMIS but consumed as shared IAIP services.

The functional requirements are structured by capability area and are presented in tabular form, using unique requirement identifiers and requirement types (M/P/I) as defined in this document.

## **SALMIS Module – Detailed Requirements**

Number	Feature	Type
	<b>GIS and Mapping Capabilities</b>	
<b>CSS.12.01</b>	The GIS and mapping capabilities of SALMIS are required to support the management of state-owned agricultural land and pastures in accordance with the Law on Agricultural Land, the Law on Pastures, and the applicable regulations governing geodetic elaborates, spatial data management, and the National Spatial Data Infrastructure (NIPP).	<b>I</b>
<b>CSS.12.02</b>	SALMIS must support zoom-in/zoom-out on the map to view different levels of detail.	<b>M</b>
<b>CSS.12.03</b>	SALMIS must support pan around the map, capability to move the map view horizontally and vertically to explore different areas	<b>M</b>
<b>CSS.12.04</b>	SALMIS must support zoom to full extent, to return the map to its default view, showing the full extent of the area	<b>M</b>
<b>CSS.12.05</b>	SALMIS must support zoom to selected features and zoom to layer	<b>M</b>
<b>CSS.12.06</b>	SALMIS must provide identify tool, allowing to click on map features to view detailed attribute information.	<b>M</b>
<b>CSS.12.07</b>	SALMIS must support measuring distance and area on the map	<b>M</b>
<b>CSS.12.08</b>	SALMIS shall always display real coordinates of the mouse pointer while moving mouse on the map.	<b>M</b>
<b>CSS.12.09</b>	SALMIS shall provide tool for conversion of coordinates, at least between EPSG: 6316, EPSG: 4258 (ETRS89) and EPSG: 4326 (WGS84) coordinate systems.	<b>M</b>
<b>CSS.12.10</b>	SALMIS must support accessing hyperlinks contained in attribute data	<b>M</b>
<b>CSS.12.11</b>	SALMIS must provide ToC (Table of Content) widget, interface to toggle visibility of different map layers	<b>M</b>
<b>CSS.12.12</b>	SALMIS must provide layer legend widget, allowing to display legend to understand the symbols and colors used in different layers	<b>M</b>
<b>CSS.12.13</b>	SALMIS must support setting transparency for all layers visible on the ToC	<b>M</b>
<b>CSS.12.14</b>	SALMIS must provide search and query widget, allowing users to find map features that satisfies search criteria.	<b>M</b>
<b>CSS.12.15</b>	SALMIS must provide spatial search widget, allowing users to find map features based on their geographic location, e.g. features that intersect with point, line, polygon, rectangle, circle and free-hand polygon	<b>M</b>
<b>CSS.12.16</b>	SALMIS must support selection of map features from one layer, that intersect with selected polygon features from another layer	<b>M</b>
<b>CSS.12.17</b>	SALMIS must provide tools for export of resulting data sets into the most popular file formats (XLSX, CSV, PD etc.) for direct usage and/or further data processing and preparing of ad-hoc reports.	<b>M</b>
<b>CSS.12.18</b>	SALMIS must support users in interactively excluding specific features from the display (filtering the map)	<b>M</b>
<b>CSS.12.19</b>	SALMIS must support working with more than one raster base-map, with the possibility for the user to choose which base-map is visible at a given time	<b>M</b>

<b>CSS.12.20</b>	SALMIS must support working with raster and vector data at the same time	<b>M</b>
<b>CSS.12.21</b>	SALMIS must support entry of spatial and attribute data and information relevant for Land Management, in a defined and controlled database structure which allows consistent elaboration, validation, and analysis of the data	<b>M</b>
<b>CSS.12.22</b>	SALMIS must support creating bookmarks, when the user wants to draw attention to particular areas in a map	<b>M</b>
<b>CSS.12.23</b>	SALMIS must support users to create simple markups, including points, lines, polygons, and text on maps. Drawn elements are intended for temporary usage only, can be printed together with other map content, but cannot be saved into database.	<b>M</b>
<b>CSS.12.24</b>	SALMIS must provide a tool for vector data editing in multi-user database environment. The tool must support users to add, delete, and update features in the source data, 2D editing, including move, scale, rotate geometries, and vertices editing.	<b>M</b>
<b>CSS.12.25</b>	SALMIS must support printing a map, with possibility to choose print template and to set printing area	<b>M</b>
<b>CSS.12.26</b>	SALMIS must support temporary addition of new map layers, by uploading CSV, SHP, GeoJSON, KML or GPX files, or by loading WMS, WFS, WMTS, vector tile service, image service and scene service	<b>M</b>
<b>CSS.12.27</b>	Besides spatial view, SALMIS must support displaying alphanumeric data in a tabular view, with possibility to show/hide selected columns and sort ascending/descending data by any column	<b>M</b>
<b>CSS.12.28</b>	Map and tabular view must be connected in a way when user selects a record(s) from the table, the same records must be selected on the map and vice-versa.	<b>M</b>
<b>CSS.12.29</b>	SALMIS must support geoprocessing services for spatial selection and export of vector data in at least CSV, SHP and GeoJSON format	<b>M</b>
	<b>Land Management Functional Requirements</b>	
<b>CSS.12.30</b>	This capability area covers legally prescribed land management procedures and related administrative workflows. SALMIS shall support implementation of these procedures in accordance with the applicable legislation, including configurable document/attachment requirements and legally defined deadlines, while ensuring traceability, auditability, and linkage to authoritative cadastral and geospatial data.	<b>I</b>
<b>CSS.12.31</b>	SALMIS shall maintain a codebook of all actions and procedures that affect the status of the state-owned agricultural land, which are described in the applicable laws and by-laws relating to this area.	<b>M</b>
<b>CSS.12.32</b>	SALMIS shall allow for the definition of the necessary attachments prescribed by law for each procedure, as well as the deadlines within which they should be submitted.	<b>M</b>
<b>CSS.12.33</b>	SALMIS shall allow for dynamic changes to the list of required attachments for each procedure – removing documents from the list or adding new documents, which would result from possible changes in the applicable legislation.	<b>M</b>
<b>CSS.12.34</b>	SALMIS should enable all manual processes related to agricultural land management to be transformed into electronic ones.	<b>I</b>
	<b>Use of undeveloped land for construction purposes</b>	

<b>CSS.12.35</b>	Legacy lease contracts may include cases where undeveloped construction land was temporarily used for agricultural purposes. SALMIS shall support recording and monitoring of such cases in accordance with applicable legislation, without enabling creation of new leases for undeveloped construction land.	<b>M</b>
<b>CSS.12.36</b>	Long-term crops or other investments that would hinder the intended purpose may not be planted on undeveloped construction land used for agricultural purposes.	<b>M</b>
<b>CSS.12.37</b>	The owner, tenant or other user of the land is not entitled to compensation for plantations or other investments on undeveloped land.	<b>I</b>
<b>CSS.12.38</b>	SALMIS should allow filtering the contracts for leasing undeveloped land for agricultural purposes by using different criteria: per municipality, per settlement, per the contract ending date etc.	<b>I</b>
	<b>Records of uncultivated agricultural land in private ownership</b>	
<b>CSS.12.39</b>	The applicable legal framework enables recording of uncultivated agricultural land in private ownership either upon owner application or ex officio. SALMIS shall support both workflows, including document submission, linkage to AREC cadastral data, support for SAI field verification through access to relevant data and information, and publication of recorded locations through a public web map where legally permitted. To facilitate future interoperability and digitalization of field verification activities, SALMIS shall provide secure and documented REST and/or SOAP service endpoints and APIs for integration with external information systems. These interfaces shall enable data exchange and support future integration with mobile or web-based client applications developed outside the scope of this contract.	<b>M</b>
<b>CSS.12.40</b>	SALMIS shall enable online registration of uncultivated agricultural land, where the land owner will be able to upload documentation proving ownership and other documents required by law.	<b>M</b>
<b>CSS.12.41</b>	SALMIS shall support the registration of uncultivated agricultural land ex officio by enabling integration with inspection activities performed by the State Agricultural Inspectorate (SAI).  Authorized SAI inspectors shall be able to access relevant cadastral and land management data and, where applicable, capture field observations using mobile-enabled tools or through integration with existing SAI systems.  Data collected from the field shall be made available to SALMIS either directly or through interoperable services, and used to initiate administrative procedures in accordance with the applicable legal framework.	<b>M</b>
<b>CSS.12.42</b>	SALMIS shall enable data on recorded uncultivated agricultural land to be presented on the MAFWE website in a form of interactive WEB map, available to the public.	<b>M</b>
	<b>Establishing real servitude on state-owned agricultural land</b>	

CSS.12.43	The applicable legal framework allows the establishment of real servitude on state-owned agricultural land exclusively for the construction of facilities of public interest, subject to a formal administrative procedure. SALMIS shall support the complete lifecycle of this procedure, including electronic submission of requests, verification of legal and technical documentation, processing of geodetic elaborates, calculation and recording of compensation, decision-making within legally prescribed deadlines, appeal handling, and preparation of data and documentation for registration in the AREC cadastre.	M
CSS.12.44	<p>SALMIS shall allow the applicant to attach following documents required by law:</p> <ul style="list-style-type: none"> <li>– proof of registration if the applicant is a legal entity, or a photocopy of an ID card or travel document if the applicant is a natural person</li> <li>– data on the agricultural land owned by the Republic of Macedonia on which the right of real servitude is sought to be based</li> <li>– proof of the right to build a building of public interest</li> </ul>	M
CSS.12.45	SALMIS shall enable the upload of a geodetic elaborate for the planned infrastructure facility, whereby the vector data accompanied by basic data on the type of facility should be imported into the GIS database of the SALMIS.	M
CSS.12.46	SALMIS shall allow the applicant to attach proof of payment, which is a prerequisite for the procedure to continue.	M
CSS.12.47	SALMIS shall enable the official to respond positively or negatively to the request for establishing a real servitude within the legally prescribed deadline.	M
CSS.12.48	SALMIS shall allow the applicant to appeal the decision received from the MAFWE.	M
CSS.12.49	SALMIS shall enable the storage of all documents related to the establishment of a real servitude from the initiation of the request by the user to the complete closure of the procedure.	M
CSS.12.50	SALMIS shall allow filtering of requests for establishing a real servitude by time period from-to, whether the request was answered positively or negatively, and request status.	M
<b>Agricultural land Exchange</b>		
CSS.12.51	In accordance with the applicable legal framework, the exchange of state-owned agricultural land with privately owned agricultural land is permitted for the purpose of consolidation, improvement of parcel structure, and rational land management. This procedure requires a formal administrative process involving valuation by licensed appraisers, legal opinions, governmental consent, and cadastral updates. SALMIS shall support the complete exchange lifecycle, including electronic submission of requests, management of legally prescribed documentation, geospatial processing of exchanged parcels, decision-making, and preparation of data and documentation for registration in AREC.	I

<b>CSS.12.52</b>	SALMIS shall support a procedure for exchanging state agricultural land with private agricultural land for the purpose of consolidating agricultural parcels.	<b>M</b>
<b>CSS.12.53</b>	SALMIS shall allow the applicant to initiate exchange procedure and to attach all required documentation required by law.	<b>M</b>
<b>CSS.12.54</b>	The system shall provide a configurable module for managing the content of exchange requests and the list of documents to be submitted by applicants, in accordance with the requirements prescribed by the Ministry. The list of required documents must be administratively manageable (additions, removals, updates) without the need for software code changes.	<b>I</b>
<b>CSS.12.55</b>	SALMIS shall allow for the attachment of the assessment of the value of the agricultural land that is the subject of the exchange.	<b>M</b>
<b>CSS.12.56</b>	The assessment of the value of the agricultural land that is the subject of exchange is carried out by a natural person - a sole proprietor who is registered in accordance with the Law on Trade Companies for carrying out appraisals and has been issued a license for appraisal and is entered in the appropriate register for authorized appraisers, as well as an appraisal company registered in accordance with the Law on Trade Companies for carrying out appraisals and has a license for appraisal and is entered in the appropriate register for authorized appraisers.	<b>I</b>
<b>CSS.12.57</b>	SALMIS shall allow for the attachment of the opinion of the State Attorney's Office of the Republic of Macedonia.	<b>M</b>
<b>CSS.12.58</b>	SALMIS shall allow for the attachment of the consent of the Government of the Republic of Macedonia to the exchange request.	<b>M</b>
<b>CSS.12.59</b>	SALMIS shall allow for the submission of the exchange agreement together with the geodetic elaborate on the basis of which the agreement was prepared to AREC for the purpose of changing the data on the cadastral parcels in accordance with the agreement.	<b>M</b>
<b>CSS.12.60</b>	SALMIS shall enable the preservation of a geodetic elaborate for agricultural land exchange.	<b>M</b>
<b>CSS.12.61</b>	SALMIS shall allow filtering of requests for agricultural land exchange by time period from date – to date and request status.	<b>M</b>
	<b>Agricultural land consolidation</b>	
<b>CSS.12.62</b>	In accordance with the applicable legal framework, the Ministry of Agriculture, Forestry and Water Economy is obliged to establish and maintain a comprehensive database for the consolidation of agricultural land. Agricultural land consolidation represents a complex administrative, legal, and geospatial process aimed at improving land structure by forming larger, more regular, and economically viable parcels through redistribution, exchange, and reallocation of state-owned and privately owned agricultural land. The procedure involves multiple stages, including initiation, feasibility analysis, definition of consolidation areas and masses, valuation of land, public review, stakeholder participation, decision-making by competent authorities, and cadastral registration. SALMIS shall provide end-to-end support for all phases of the consolidation process, ensuring structured management of alphanumeric and geospatial data, document handling, public transparency, decision traceability, and seamless data exchange with the Agency for Real Estate Cadastre (AREC).	<b>I</b>
<b>CSS.12.63</b>	The MAFWE is obliged to establish and maintain a database for the consolidation of agricultural land.	<b>M</b>
<b>CSS.12.64</b>	The database shall record:	<b>M</b>

	<ul style="list-style-type: none"> <li>– State-owned agricultural land entered into the consolidation mass,</li> <li>– Privately owned agricultural land purchased by the MAFWE in consolidation procedures or in procedures using the right of priority purchase of agricultural land,</li> <li>– Private land entered into the consolidation mass and</li> <li>– Agricultural land intended for general and common needs of agricultural holdings.</li> </ul>	
<b>CSS.12.65</b>	SALMIS shall provide support for the processes of consolidation of state and private agricultural land to create larger land parcels and areas with a more regular shape.	<b>M</b>
<b>CSS.12.66</b>	The consolidation is carried out in accordance with the Spatial Plan of the Republic of North Macedonia and the general urban plan of the municipality in whose area the consolidation is being implemented.	<b>I</b>
<b>CSS.12.67</b>	SALMIS shall enable the determination of the consolidation area and consolidation mass by using GIS tools.	<b>M</b>
<b>CSS.12.68</b>	<p>SALMIS shall provide support for implementing consolidation in a specific area:</p> <ul style="list-style-type: none"> <li>– by distribution with change of boundaries of cadastral parcels that are part of the consolidation mass;</li> <li>– by distribution without change of boundaries of cadastral parcels that are part of the consolidation mass;</li> <li>– by exchanging agricultural land between landowners in the consolidation area</li> </ul>	<b>M</b>
<b>CSS.12.69</b>	SALMIS shall enable MAFWE to establish and maintain a register of contractors for the purpose of consolidation, which may be sole proprietors, certified surveyors and trade companies for surveying works.	<b>M</b>
<b>CSS.12.70</b>	SALMIS shall allow for the initiation of a consolidation initiative ex officio or at the request of the owners of more than 50% of the land in the consolidation area.	<b>M</b>
<b>CSS.12.71</b>	SALMIS shall allow for the attachment of a feasibility study for implementing a consolidation procedure in the consolidation area.	<b>M</b>
<b>CSS.12.72</b>	SALMIS shall enable the MAFWE to prepare a proposal and initiate a consolidation procedure with distribution ex officio based on the prepared study for implementing a consolidation procedure in the consolidation area.	<b>M</b>
<b>CSS.12.73</b>	<p>The consolidation proposal shall contain the following information:</p> <ul style="list-style-type: none"> <li>– Reasons for the consolidation and an analysis of the costs of the consolidation procedure</li> <li>– Name of the cadastral municipality, area in hectares and number of parcels, number of participants in the consolidation, average size of parcels to which there is a right of private ownership, average number of parcels per family, location, number of parcels and area of state-owned agricultural land and land under long-term plantations</li> <li>– Works and measures that would be implemented simultaneously with the consolidation</li> <li>– Data on the planned or invested funds for investment works</li> <li>– A general plan with borders of the consolidation area showing the current position of the road and canal network, long-term plantations and constructed facilities, as well as a sketch of the position of the cadastral parcels before the consolidation and an indicative position after the consolidation</li> </ul>	<b>M</b>

<b>CSS.12.74</b>	SALMIS shall allow for the attachment of all documents related to/created in the consolidation procedure.	<b>M</b>
<b>CSS.12.75</b>	The decision to initiate a consolidation procedure is made by the Government of the Republic of North Macedonia upon a proposal from MAFWE.	<b>I</b>
<b>CSS.12.76</b>	SALMIS shall enable the MAFWE to record decisions for appointment of committee members to implement the consolidation procedure.	<b>M</b>
<b>CSS.12.77</b>	SALMIS shall enable the MAFWE, during the consolidation procedure, to submit an application for registration of the right of ownership with AREC for agricultural land in the consolidation area that has unregistered rights, based on a geodetic elaborate or other legal basis.	<b>M</b>
<b>CSS.12.78</b>	SALMIS shall enable public review of the estimated value of the land in the consolidation area, before and after the consolidation.	<b>M</b>
<b>CSS.12.79</b>	SALMIS shall allow participants in the consolidation to submit comments to the Commission during the public review period.	<b>M</b>
<b>CSS.12.80</b>	SALMIS shall allow public review of the draft land allocation plan in the consolidation area.	<b>M</b>
<b>CSS.12.81</b>	The draft distribution plan shall contain: <ul style="list-style-type: none"> <li>– Boundaries of the consolidation area and a cadastral plan for the position of the cadastral parcels before the consolidation,</li> <li>– Boundaries of the consolidation area showing the current position of the road and canal network for irrigation and drainage, other investments, long-term plantations and constructed facilities, as well as a cadastral plan for the position of the cadastral parcels before the consolidation,</li> <li>– Personal data of the participant, number of cadastral parcels before and after the completion of the consolidation procedure, area and value of each parcel before and after the completion of the consolidation procedure and other data important for the consolidation of the land (recorded other real rights such as mortgages, real burdens, easements, as well as recorded restrictions and notes of facts affecting the cadastral parcels) and</li> <li>– New condition of the distributed parcels after the completion of the consolidation procedure</li> </ul>	<b>M</b>
<b>CSS.12.82</b>	SALMIS shall enable each participant in the consolidation to submit a comment to the Commission no later than the end of the public review.	<b>M</b>
<b>CSS.12.83</b>	SALMIS shall enable the Commission to express its opinion on the comments in the proposal for adopting a decision on land allocation.	<b>M</b>
<b>CSS.12.84</b>	SALMIS shall allow each participant in the consolidation to submit a statement of agreement with the land allocation plan.	<b>M</b>
<b>CSS.12.85</b>	SALMIS shall enable the preservation of a geodetic elaborate for consolidation, prepared on the basis of an adopted proposal for the acceptance of a decision for land allocation in the consolidation area.	<b>M</b>
<b>CSS.12.86</b>	SALMIS shall enable the MAFWE to submit to AREC a decision to initiate a consolidation procedure, for the purpose of recording a prohibition on the disposal of the real estate that is the subject of the decision.	<b>M</b>
<b>CSS.12.87</b>	SALMIS shall enable the MAFWE to submit to AREC a geodetic elaborate with all necessary data for making a decision on the land allocation from the consolidation mass, for verification, approval and implementation.	<b>M</b>

<b>CSS.12.88</b>	SALMIS shall allow filtering of consolidation procedures by time period from date – to date and consolidation procedure status.	<b>M</b>
	<b>Sale of state-owned agricultural land</b>	
<b>CSS.12.89</b>	The sale of state-owned agricultural land is carried out through a legally prescribed procedure that includes strategic planning, public transparency, and competitive selection of buyers. The Ministry of Agriculture, Forestry and Water Economy prepares an annual program defining the scope, conditions, and limits for the sale of state-owned agricultural land, which is subject to public review and subsequent implementation through public announcements and auctions. The procedure involves clearly defined eligibility criteria for natural persons and legal entities, submission and verification of supporting documentation, participation guarantees, decision-making by competent commissions, and long-term monitoring of contractual obligations, including installment-based payments and compliance with sale conditions. SALMIS shall provide comprehensive functional support for the end-to-end digital management of this procedure, ensuring transparency, traceability, legal compliance, and efficient administration throughout all phases of the sale process.	<b>I</b>
<b>CSS.12.90</b>	SALMIS shall provide support for the procedures and actions for the sale of state-owned agricultural land.	<b>M</b>
<b>CSS.12.91</b>	SALMIS shall provide graphical interface with possibility to filter the agricultural land parcels by different criteria to support the MAFWE in the preparation of an annual program for the sale of state-owned agricultural land.	<b>M</b>
<b>CSS.12.92</b>	SALMIS shall allow the proposed program to be made available for public review.	<b>M</b>
<b>CSS.12.93</b>	SALMIS shall allow interested parties to submit suggestions, objections and initiatives to the draft program, no later than 30 days after the end of the public review.	<b>M</b>
<b>CSS.12.94</b>	SALMIS shall enable individuals and legal entities that have concluded a lease agreement for state-owned agricultural land to submit an initiative for the sale of the land that is the subject of the lease agreement to the MAFWE.	<b>M</b>
<b>CSS.12.95</b>	When preparing the draft program, the MAFWE takes into account the opinions of the municipalities or the City of Skopje, as well as the suggestions, objections and initiatives of interested parties.	<b>M</b>
<b>CSS.12.96</b>	The proposed program shall contain at least the following data: <ul style="list-style-type: none"> <li>– Total area of state-owned agricultural land</li> <li>– The area of state-owned agricultural land that will be subject to sale in the following year, parceled into areas of up to 10 Ha</li> <li>– The area of state-owned agricultural land that will be subject to sale in the following year, parceled into areas of over 10 Ha</li> <li>– Cadastral data contained in the property deed, purpose of the land, data on whether a lease agreement for the agricultural land has been concluded, data on the duration of the lease, easement or other burdens on the land and the condition of the land (under cultivation or not)</li> <li>– Maximum area of state-owned agricultural land that can be sold to one natural person, i.e. one legal entity, including interconnected persons</li> <li>– Cumulative area of state-owned agricultural land that can be sold to one natural person, i.e. one legal entity, including interconnected persons</li> </ul>	<b>M</b>
<b>CSS.12.97</b>	SALMIS shall allow for keeping records of advertisements for the sale of state-owned agricultural land.	<b>M</b>

<b>CSS.12.98</b>	Advertisements for the sale of state-owned agricultural land shall contain at least the following information:	<b>M</b>
	<ul style="list-style-type: none"> <li>– Total area for sale</li> <li>– Parcels of land subject to sale, with basic information contained in the property deed, information on lease, easement or other land encumbrances</li> <li>– Starting price of the public auction</li> <li>– Duration of the advertisement</li> <li>– Required documents for individuals, i.e. legal entities</li> <li>– Proof of a paid deposit or bank guarantee in the amount of 5% of the estimated value of the land</li> </ul>	
<b>CSS.12.99</b>	SALMIS shall enable online submission of the necessary documentation for participation in the public auction.	<b>M</b>
<b>CSS.12.100</b>	<p>Legal entities shall submit the following documentation:</p> <ul style="list-style-type: none"> <li>– Proof (act) issued by the Central Registry of the Republic of North Macedonia for the completed entry in the trade register or by another competent authority for the registration of legal entities,</li> <li>– Proof of settled public duties,</li> <li>– Statement (certified by a notary) from the founders and the responsible person in the legal entity that they were not founders or managers of the legal entity that used state-owned agricultural land under lease, and which did not fulfill the obligations from that agreement,</li> <li>– Other necessary documentation specified in the public notice and</li> <li>– Bank guarantee or deposit for participation in the notice in the amount of 5% of the estimated value of the agricultural land published in the public notice</li> </ul>	<b>M</b>
<b>CSS.12.101</b>	<p>Natural persons shall submit the following documentation:</p> <ul style="list-style-type: none"> <li>– Citizenship,</li> <li>– Decision for registered agricultural activity provider or proof from the central register for registered sole proprietor,</li> <li>– Proof of settled public duties,</li> <li>– Confirmation from a regional unit of the Ministry that there are no obligations in terms of unpaid rent for the use of state-owned agricultural land and other public duties (water fee, pasture fee and other fees),</li> <li>– A statement certified by a notary that he was not a founder or responsible person in the legal entity that used state-owned agricultural land under lease, and which did not fulfill the obligations from that agreement and</li> <li>– Bank guarantee or deposit for participation in the announcement in the amount of 5% of the estimated value of the agricultural land published in the public announcement.</li> </ul>	<b>M</b>
<b>CSS.12.102</b>	SALMIS shall allow for record keeping for members of the commission for the sale of state agricultural land.	<b>M</b>
<b>CSS.12.103</b>	SALMIS shall enable the determination of a list of Suppliers who have complete documentation and who will be invited to the public auction.	<b>M</b>
<b>CSS.12.104</b>	SALMIS shall allow for record keeping for buyers of state-owned agricultural land.	<b>M</b>

<b>CSS.12.105</b>	SALMIS shall enable keeping records of payments made under contracts for the purchase of state agricultural land. For legal entity buyers, the total amount can be paid in 5 equal annual installments, and for individuals, the total amount of the contract can be paid in 10 equal annual installments.	<b>M</b>
<b>CSS.12.106</b>	SALMIS shall send automatic notifications to responsible persons at the MAFWE in case of late payment of annual installments and reminders to customers who are late with their payments.	<b>M</b>
<b>CSS.12.107</b>	SALMIS shall allow for the storage of all documents related to/generated in the procedure for the sale of state agricultural land.	<b>M</b>
<b>CSS.12.108</b>	SALMIS shall be able to generate periodic reports on the implementation of the program for the sale of state agricultural land, which the MAFWE is obliged to submit to the Government every six months.	<b>M</b>
<b>CSS.12.109</b>	SALMIS shall enable filtering of records for the sale of state agricultural land at least by date - to date period, by advertisement number, by buyer code/name.	<b>M</b>
	<b>Lease of state-owned agricultural land</b>	
<b>CSS.12.110</b>	The leasing of state-owned agricultural land represents one of the core operational processes carried out by the Ministry of Agriculture, Forestry and Water Economy through its central and regional units. This process encompasses the full lifecycle of land leasing, including planning and publication of public announcements and calls for bidding, submission and evaluation of applications from natural persons and legal entities, selection of the most favorable bidder, contract conclusion, registration of lease rights, and long-term monitoring of contractual obligations. Different leasing modalities are applied depending on the size of the land parcel, the purpose of use, and the legal status of the applicant, including public announcements, electronic public bidding, and direct agreements in legally defined cases. SALMIS shall provide comprehensive digital support for managing these procedures end-to-end, ensuring standardized workflows across regional units, integration of geospatial and alphanumeric data, secure exchange of information with external registers, traceability of decisions, and effective monitoring of payments, guarantees, contract amendments, renewals, and terminations throughout the entire lease period.	<b>I</b>
<b>CSS.12.111</b>	SALMIS shall be able to maintain a codebook of agricultural land use purposes.	<b>M</b>
<b>CSS.12.112</b>	SALMIS shall enable the MAFWE to conclude agreements for the lease of agricultural land by legal entities and individuals through a public announcement procedure, public call for bidding procedure or through lease with direct agreement.	<b>M</b>
<b>CSS.12.113</b>	SALMIS shall enable the management and storage of records for public announcements for the lease of agricultural land.	<b>M</b>
<b>CSS.12.114</b>	The public announcement for leasing state-owned agricultural land can be for areas up to 3 Ha and for areas larger than 3 Ha.	<b>M</b>
<b>CSS.12.115</b>	The public announcement for the lease of areas up to 3 Ha contains the following data: <ul style="list-style-type: none"> <li>– Area in hectares that is being leased,</li> <li>– The maximum area in hectares that a Supplier can obtain following the notice in relation to the offered cadastral parcels,</li> </ul>	<b>M</b>

	<ul style="list-style-type: none"> <li>– Cadastral data contained in the property or title deed or data on where they are published, purpose of the agricultural land, easements and other land encumbrances, duration of the lease in accordance with Article 18 of this Law, condition of the land (under cultivation or not),</li> <li>– Starting price per hectare in accordance with Law on agricultural land</li> <li>– Deadline for submitting bids.</li> </ul>	
<b>CSS.12.116</b>	<p>Required documentation for legal entities:</p> <ul style="list-style-type: none"> <li>– a bid form from a regional unit of the MAFWE,</li> <li>– a document issued by the Central Registry for the registration in the trade register,</li> <li>– a document for settled obligations in terms of tax obligations and contributions,</li> <li>– a business plan containing basic data about the participant, the purpose for which the land will be used, applied technology, number of employees, market aspects and expected production and economic results and the amount of planned investment,</li> <li>– a statement given under full material and criminal liability that the bid is submitted independently without an agreement with other participants in the public announcement</li> <li>– a statement certified by a notary on the reliability of the data provided with the application for participation,</li> <li>– a bid for the amount of the annual rent and</li> <li>– a statement (certified by a notary) from the founders and the responsible person in the legal entity that they were not founders or managers of the legal entity that used agricultural land in state ownership under lease, and which did not fulfill the obligations from that agreement</li> <li>– other necessary documentation specified in the public announcement</li> </ul>	<b>M</b>
<b>CSS.12.117</b>	<p>Required documentation for natural persons:</p> <ul style="list-style-type: none"> <li>– a bid form from a regional unit of the MAFWE,</li> <li>– proof of settled obligations in terms of tax obligations and contributions,</li> <li>– a certificate of entry in the single register of agricultural holdings, a decision for a registered agricultural activity provider or proof from the central register for a registered sole proprietor,</li> <li>– a land use program containing basic data on the family, technical and technological equipment, the purpose for which the land is used and market aspects and the amount of the planned investment,</li> <li>– a statement on the reliability of the data provided with the application certified by a notary,</li> <li>– a statement given under full material and criminal liability that the bid is submitted independently without an agreement with other participants in the public announcement,</li> <li>– a bid for the amount of the annual rent,</li> <li>– a statement certified by a notary that he was not a founder or a responsible person in the legal entity that used state-owned agricultural land under lease, and which did not fulfill the obligations of that agreement</li> <li>– other necessary documentation specified in the public announcement</li> </ul>	<b>M</b>

<b>CSS.12.118</b>	The public announcement for the lease of areas larger than 3 Ha contains the following data:	<b>M</b>
	<ul style="list-style-type: none"> <li>– Area in hectares that is leased</li> <li>– Cadastral data contained in the property certificate or data on where they are published; purpose of the agricultural land; easements and other land encumbrances; duration of the lease in accordance with the Law on agricultural land; condition of the land (under cultivation or not)</li> <li>– Starting price per Ha</li> <li>– Deadline for submission and way of submission of applications for participation in the public auction</li> <li>– Time of commencement and duration of the public auction</li> <li>– Conditions for participation in the public auction for foreign individuals and legal entities</li> <li>– Required documentation for participation in a public announcement, for legal and natural persons</li> </ul>	
<b>CSS.12.119</b>	<p>Required documentation for legal entities:</p> <ul style="list-style-type: none"> <li>– application form from a regional unit of the MAFWE</li> <li>– proof (act) issued by the Central Register for the completed entry in the Trade Register</li> <li>– proof of settled obligations in terms of tax obligations and contributions</li> <li>– business plan containing basic data about the participant, the purpose for which the land is used, applied technology, number of employees, market aspects, expected production and economic results</li> <li>– statement (certified by a notary) from the founders and the responsible person in the legal entity that they were not founders or managers of the legal entity that used agricultural land in state ownership under lease, and which did not fulfill the obligations from that agreement</li> <li>– bank guarantee for participation in a public announcement in the amount of the offered nine-month rent,</li> <li>– other necessary documentation specified in the public announcement</li> </ul>	<b>M</b>
<b>CSS.12.120</b>	<p>Required documentation for natural persons:</p> <ul style="list-style-type: none"> <li>– application form from a regional unit of the MAFWE</li> <li>– proof of settled obligations in terms of tax obligations and contributions</li> <li>– photocopy of ID card</li> <li>– confirmation of entry in the single register of agricultural holdings, a decision for a registered agricultural operator or proof from the central register for a registered sole proprietor</li> <li>– land use program</li> <li>– a statement on the reliability of the data provided with the application certified by a notary</li> <li>– a statement certified by a notary that he was not a founder or a responsible person in the legal entity that used state-owned agricultural land under lease, and which did not fulfill the obligations of that contract</li> <li>– a bank guarantee for participation in a public tender in the amount of the offered nine-month lease,</li> <li>– other necessary documentation specified in the public tender</li> </ul>	<b>M</b>
<b>CSS.12.121</b>	The public call for the bidding procedure for the lease of agricultural land up to 3 Ha contains the following data:	<b>M</b>

	<ul style="list-style-type: none"> <li>– Invitation to submit a bid for taking state-owned agricultural land under lease,</li> </ul>	
	<ul style="list-style-type: none"> <li>– Cadastral municipality where the land for which a bid can be submitted is located,</li> <li>– The maximum area in hectares that a Supplier can receive,</li> <li>– The lowest annual rent per hectare that they can offer,</li> <li>– Purpose of the agricultural land,</li> <li>– Duration of the lease in accordance with the Law on Agricultural Land,</li> <li>– Deadline for submitting bids</li> <li>– The necessary documentation</li> </ul>	
<b>CSS.12.122</b>	<p>The public call for the bidding procedure for the lease of agricultural land larger than 3 Ha contains the following data:</p> <ul style="list-style-type: none"> <li>– Invitation to submit a bid for taking state-owned agricultural land under lease,</li> <li>– Cadastral municipality where the land for which a bid can be submitted is located,</li> <li>– The maximum area in hectares that a Supplier can receive,</li> <li>– The lowest annual rent per hectare that they can offer,</li> <li>– Bank guarantee for participation in the procedure,</li> <li>– Bank guarantee for quality and timely execution of the contract,</li> <li>– Purpose of the agricultural land,</li> <li>– Duration of the lease in accordance with the Law on Agricultural Land,</li> <li>– Deadline for submitting bids</li> <li>– The necessary documentation</li> </ul>	<b>M</b>
<b>CSS.12.123</b>	SALMIS shall enable the keeping and storage of records for the members of the commission responsible for implementing the procedure for the lease of state-owned agriculture land.	<b>M</b>
<b>CSS.12.124</b>	SALMIS shall allow for the submission of online applications for the lease of state-owned agriculture land, according to the Law on agricultural land.	<b>M</b>
<b>CSS.12.125</b>	The Commission selects the most favorable Supplier based on the highest annual rent offered, except for agricultural land areas up to 3 ha where the selection of the most favorable Supplier is also made according to the place of residence, i.e. the seat of the Supplier in relation to the advertised land and the legal status of the Supplier.	<b>M</b>
<b>CSS.12.126</b>	The selection of the most favorable Supplier in the procedure following a public announcement for the provision of agricultural land in state ownership over 3 hectares is carried out based on the highest offered annual revenue per hectare achieved through electronic public bidding.	<b>M</b>
<b>CSS.12.127</b>	SALMIS shall allow sending email notifications about the selection of the most favorable offer to all Suppliers.	<b>M</b>
<b>CSS.12.128</b>	Suppliers who are dissatisfied with the decision have the right to file an appeal with a competent court.	<b>M</b>
<b>CSS.12.129</b>	For the needs of public scientific and state educational institutions in the field of agriculture and for secondary education schools established by the municipality and the city of Skopje in the field of agriculture, as well as for the needs of penal and correctional and educational institutions for the performance of production activities by convicted persons, the Minister may lease state-owned agricultural land by direct agreement upon prior consent of the Government of the Republic of Macedonia. SALMIS shall support agricultural land in state ownership to be allocated for this purpose	<b>M</b>

	through selection on graphic interface. Direct agreement can be concluded only with eligible institutions, without renting fee and for a duration of max 20 years.	
<b>CSS.12.130</b>	<p>SALMIS shall provide input of a new agricultural land lease contract with at least the following attributes:</p> <ul style="list-style-type: none"> <li>– Parcels subject to the contract (For the parcels, it is necessary to enter data on cadastral department, cadastral municipality, number and sub-number of the parcel, number of the property list, area of the parcel, cadastral culture, cadastral class and named place). Data for parcels shall be automatically loaded into the system from the geodetic elaborate in digital form.</li> <li>– Contract number</li> <li>– Purpose of contract</li> <li>– Type of contract</li> <li>– Date of contract</li> <li>– Effective date</li> <li>– Expiration date</li> <li>– Branch office</li> <li>– Rent</li> <li>– Rent Value</li> <li>– Kilograms of wheat</li> <li>– Unit price per kilogram</li> <li>– Advertisement/call number</li> <li>– Date of advertisement/call</li> <li>– Exempt from payment</li> <li>– Recorded lease contracts in AREC</li> <li>– Court procedures</li> </ul> <p>The system shall allow the entering of different types of purpose within the framework of one contract.</p>	<b>M</b>
<b>CSS.12.131</b>	<p>SALMIS shall provide the entry of a bank guarantee of the contract with at least the following attributes:</p> <ul style="list-style-type: none"> <li>– Bank guarantee number</li> <li>– Value of bank guarantee</li> <li>– Validity of bank guarantee.</li> </ul>	<b>M</b>
<b>CSS.12.132</b>	If the lessee has fully fulfilled the obligations from the lease agreement, the Minister may, at the request of the lessee, by direct agreement, to conclude a new lease agreement with the lessee. The request for the renewal of the agreement shall be submitted by the lessee to the MAFWE within six months before the expiration of the agreement.	<b>M</b>
<b>CSS.12.133</b>	A bank guarantee shall also be submitted before the renewal of the contract, no later than 30 days before the expiration of the renewal period.	<b>M</b>
<b>CSS.12.134</b>	If the bank guarantee is not renewed within the stipulated period, it constitutes grounds for termination of the contract.	<b>M</b>
<b>CSS.12.135</b>	The lease agreement enters into force on the day the lessor takes possession of the agricultural land subject to the agreement, and only for the areas for which he has been placed in actual control.	<b>M</b>
<b>CSS.12.136</b>	SALMIS shall provide a minute of taking possession with at least the following attributes:	<b>M</b>

	<ul style="list-style-type: none"> <li>– Number of minutes</li> <li>– Date of minutes</li> <li>– Committee members.</li> </ul>	
<b>CSS.12.137</b>	<p>SALMIS shall provide the entry of a geodetic elaborate for the contract. The geodetic elaborate must be made in digital form in accordance with the rules of the AREC and with at least the following attributes:</p> <ul style="list-style-type: none"> <li>– Number of Geodetic elaborate</li> <li>– Date of geodetic elaborate</li> <li>– Company that prepared the geodetic elaborate</li> <li>– Graphical data that are the subject of the lease contracts (area, part of the parcel that is the subject of the lease).</li> </ul> <p>The geodetic elaborate shall be automatically loaded into the system in digital form.</p>	<b>M</b>
<b>CSS.12.138</b>	<p>The MAFWE is obliged to submit a copy of the lease agreement and the minutes of introduction into possession, together with the application for registration electronically, to the AREC for the purpose of recording the lease agreement in the real estate cadastre.</p>	<b>M</b>
<b>CSS.12.139</b>	<p>SALMIS shall provide a Lessee entry for the contract with at least the following attributes:</p> <ul style="list-style-type: none"> <li>– Name/ Company name</li> <li>– Surname</li> <li>– ID number/Company ID number</li> <li>– VAT number</li> <li>– Telephone</li> <li>– E-mail</li> <li>– Local self-government unit</li> <li>– Inhabited place</li> <li>– Address.</li> </ul> <p>Part of the data needs to be obtained through a web service to ensure the accuracy of the data from the CRNM, the Population Registry and the Office for Management of Registers. The Office for Management of Registers shall be notified when someone dies to check that the person is registered as a tenant in the system and to follow the legal provisions.</p>	<b>M</b>
<b>CSS.12.140</b>	<p>SALMIS shall allow for the upload of all required application documentation.</p>	<b>M</b>
<b>CSS.12.141</b>	<p>SALMIS shall provide Documents in the central database in electronic form that are an integral part of the contract (made in paper form) with the following attributes:</p> <ul style="list-style-type: none"> <li>– Description of the document</li> <li>– Document name</li> <li>– Document type (defined codebook with document types);</li> <li>– Possibility to import different types of documents (.doc, .xls, .txt, .pdf, .dwg/dxf, dgn, .jpg and others).</li> </ul>	<b>M</b>
<b>CSS.12.142</b>	<p>SALMIS shall provide a contract Annex entry with at least the following attributes:</p> <ul style="list-style-type: none"> <li>– Annex number</li> <li>– Date of annex</li> <li>– Date of taking possession of the annex</li> </ul>	<b>M</b>

	<ul style="list-style-type: none"> <li>- Expiry date of the annex</li> <li>- Attaching documents in electronic form.</li> </ul> <p>After entering the annex in the application, it is necessary to be able to change all previously entered data of the lease contract (parcels, areas, rent value, purpose of lease, Lessee and others).</p>	
<b>CSS.12.143</b>	<p>SALMIS shall provide a Termination of contract entry with at least the following attributes:</p> <ul style="list-style-type: none"> <li>- Type of contract termination</li> <li>- Number of legal document</li> <li>- Date of legal document</li> <li>- Effective date</li> <li>- Attaching documents in electronic form.</li> </ul>	<b>M</b>
<b>CSS.12.144</b>	<p>In the event of the termination of the lease agreement due to bankruptcy or a change in the legal status of the lessee, or in the case of the lessee's passing, SALMIS shall support transfer of user rights to the legal successors of the lessee under the same conditions as stipulated in the agreement originally concluded with the lessee who underwent status changes, provided that any outstanding and unpaid lease fees are fully settled.</p>	<b>M</b>
<b>CSS.12.145</b>	<p>SALMIS shall provide a Contract Payments entry with at least the following attributes:</p> <ul style="list-style-type: none"> <li>- Payment for the year</li> <li>- Amount of payment</li> <li>- Currency</li> <li>- Kilograms of wheat</li> <li>- Unit price per kilogram</li> <li>- Date of payment</li> <li>- Attaching documents in electronic form.</li> </ul> <p>The payments can be made in several installments during the year.</p> <p>SALMIS shall enable printing of a payment order for payment of the amount according to the contract, in order to more easily connect payments with the purpose for which the payment was made.</p>	<b>M</b>
<b>CSS.12.146</b>	<p>SALMIS shall allow for more than one purpose to be included in a single agreement for the lease of agriculture land.</p>	<b>M</b>
<b>CSS.12.147</b>	<p>SALMIS shall enable data exchange with all farms from FR, the Register of Trade Companies maintained in the CRNM, and the Central Population Register maintained in the MDT.</p>	<b>M</b>
<b>CSS.12.148</b>	<p>SALMIS shall enable data exchange with real estate (parcels and buildings) register maintained in AREC.</p>	<b>M</b>
<b>CSS.12.149</b>	<p>SALMIS shall allow for the upload of all documents related to/created in the procedure for lease of state-owned agriculture land.</p>	<b>M</b>
<b>CSS.12.150</b>	<p>For the lease of agricultural land, the user is obliged to pay compensation in accordance with the contract concluded with MAFWE.</p>	<b>M</b>
<b>CSS.12.151</b>	<p>SALMIS shall allow sending information to MAFWE when the user is late with payment according to the contract and a reminder to the user who is late with payment.</p>	<b>M</b>
<b>CSS.12.152</b>	<p>SALMIS shall calculate interest on late payments and additionally debit the user with the calculated interest.</p>	<b>M</b>

<b>CSS.12.153</b>	If the tenant fails to make payment within the stipulated deadline after receiving a warning, the MAFWE submits a statement for termination of the contract.	<b>M</b>
<b>CSS.12.154</b>	Natural and legal persons whose lease agreement has been terminated due to untimely payment of the lease fee may submit a request to the MAFWE for the revocation of the statement for termination of the lease agreement if, by the day of the handover or seizure of possession of the agricultural land subject to the agreement, they submit proof of paid rent with penalty interest for late payment of the rent and proof of paid compensation for damage in the amount of the annual rent for the period for which they held the agricultural land without legal basis.	<b>M</b>
<b>CSS.12.155</b>	SALMIS shall allow filtering of the database of contracts for the lease of state-owned agricultural land at least by time period from date to date, by advertisement number, by user and by purpose of the lease.	<b>M</b>
<b>CSS.12.156</b>	SALMIS shall enable searching for entered contracts for the lease of agriculture land according to various parameters: <ul style="list-style-type: none"> <li>– Contract number</li> <li>– Type of contract</li> <li>– Purpose of contract</li> <li>– Lessee</li> <li>– ID number/Company ID number</li> <li>– VAT number</li> <li>– Cadastral parcel number</li> <li>– Cadastral municipality</li> <li>– Cadastral department</li> <li>– Contract completion date</li> <li>– Units of local self-government</li> <li>– Contracts that are exempt from payment</li> <li>– Active/inactive contracts</li> <li>– Paid/unpaid liabilities on an annual basis</li> <li>– Number of bank guarantee</li> <li>– Bank guarantees that expire</li> </ul>	<b>M</b>
	<b>Usufruct on state-owned agricultural land</b>	
<b>CSS.12.157</b>	Usufruct of state-owned agricultural land is a special legal mechanism intended to support socially vulnerable categories of persons through temporary, non-commercial use of agricultural land under conditions defined by law and government programs. The procedure is program-based, time-limited, and subject to strict eligibility criteria, with usufruct agreements concluded for a maximum period of five years and the possibility of transformation into a lease agreement where legally permitted. SALMIS shall provide targeted digital support for managing usufruct programs, including beneficiary eligibility management, allocation of available land, workflow-based processing of requests, registration of agreements and terminations, and electronic exchange of data and decisions with the Agency for Real Estate Cadastre.	<b>I</b>
<b>CSS.12.158</b>	SALMIS shall provide support for the processes related to granting state agricultural land for usufruct.	<b>M</b>
<b>CSS.12.159</b>	SALMIS shall enable record keeping for programs for the usufruct of state agricultural land that the Government adopts for certain categories of socially vulnerable persons.	<b>M</b>

<b>CSS.12.160</b>	<p>For the purposes of adopting and managing a usufruct program, SALMIS shall provide dedicated functionalities that will enable:</p> <ul style="list-style-type: none"> <li>– Definition and management of eligibility categories for socially unsecured persons, including criteria configuration, data import from relevant registries, and validation of eligibility status.</li> <li>– Creation and maintenance of a dedicated land fund for usufruct, including registration of available state-owned agricultural land parcels, linkage with cadastral data, and monitoring of land allocation.</li> <li>– Workflow management for granting land for usufruct, including application submission, review, approval, contract generation, and audit trail of decisions.</li> <li>– Planning and tracking of land infrastructure needs, including recording infrastructure projects, linking them to allocated land, and monitoring progress.</li> <li>– Assignment and monitoring of responsible institutions and actors, with role-based access control, task allocation, and reporting functionalities.</li> </ul>	<b>M</b>
<b>CSS.12.161</b>	SALMIS shall support MAFWE to submit a copy of the usufruct agreement to AREC, for the purpose of recording the agreement in the real estate cadastre.	<b>M</b>
<b>CSS.12.162</b>	The usufruct agreement is concluded for a maximum period of 5 years, after which, if there is interest, it can be transformed into a lease agreement.	<b>M</b>
<b>CSS.12.163</b>	SALMIS shall allow for online submission of a request to transform a usufruct agreement into a lease agreement, along with all supporting documentation.	<b>M</b>
<b>CSS.12.164</b>	SALMIS shall allow for recording the termination of the usufruct agreement and the reasons for the termination of the agreement, as provided for in the Law on Agricultural Land.	<b>M</b>
<b>CSS.12.165</b>	SALMIS shall record the unilateral termination of a usufruct agreement by the MAFWE and the reasons for termination, as provided for in the Law on Agricultural Land.	<b>M</b>
<b>CSS.12.166</b>	The MAFWE is obliged to submit a copy of the decision to terminate, i.e. terminate the usufruct agreement to AREC, for the purpose of deleting the note in the real estate cadastre.	<b>M</b>
	<b>Permanent conversion of agricultural land into construction land</b>	
<b>CSS.12.167</b>	SALMIS shall provide support for the process of permanent conversion of agricultural land into construction land.	<b>M</b>
<b>CSS.12.168</b>	SALMIS shall allow for the storage of records of requests for permanent conversion of agricultural land into construction land, received through the e-urbanizam system.	<b>M</b>

<b>CSS.12.169</b>	Since the entire procedure for permanent conversion of agricultural land into construction land and all accompanying documentation is conducted through the e-urbanizam system, SALMIS shall only allow the import of a geodetic elaborate that the investor of the urban plan and/or urban project is obliged to submit together with the request for permanent conversion, and which contains a graphic display and alphanumeric data for the area for which permanent conversion is requested. Based on the imported geodetic elaborate, SALMIS shall provide data on the cadastral indications of the agricultural land, the area of coverage, the number and description of the lease agreements, i.e. agreements for the use of pastures that are subject to granting consent for the permanent conversion of agricultural land into construction land.	<b>M</b>
	<b>Use of state-owned agricultural land for non-agricultural purposes</b>	
<b>CSS.12.170</b>	<p>SALMIS shall support the procedure for granting concessions on state-owned agricultural land for non-agricultural purposes, specifically for the exploitation of mineral resources, by enabling structured submission, spatial validation, and analytical assessment of requests initiated by the Ministry of Economy.</p> <p>The system shall function as a supporting platform for data collection, geospatial analysis, and inter-institutional coordination, while the legal decision-making authority remains with the competent institutions in accordance with applicable legislation.</p> <p>Within this context, SALMIS shall ensure the intake and management of legally required documentation and geodetic elaborates, perform spatial overlay analysis against existing leases of state-owned agricultural land, and provide a clear analytical basis for issuing positive or negative responses, including legally defined exceptions for minerals of public interest.</p>	<b>I</b>
<b>CSS.12.171</b>	SALMIS shall enable online submission of requests by the Ministry of Economy for obtaining a concession on agricultural land for the exploitation of mineral resources.	<b>M</b>
<b>CSS.12.172</b>	SALMIS shall allow the applicant to attach all required documentation required by law. Incomplete requests will not be taken into consideration.	<b>M</b>
<b>CSS.12.173</b>	SALMIS shall enable the upload of a geodetic elaborate for the planned scope of the concession area, whereby the vector data accompanied by basic data on the concession should be imported into the GIS database of the MAFWE.	<b>M</b>
<b>CSS.12.174</b>	SALMIS shall allow for overlapping of the submitted geodetic elaborate with the layer of state-owned agricultural land leased. If the requested coverage intersects with leased land, a negative response is given, except for minerals of public interest determined as such in accordance with the Law on Mineral Resources. If the requested coverage does not intersect with leased land, the response should be positive.	<b>M</b>
<b>CSS.12.175</b>	SALMIS shall allow filtering of the database of submitted requests for the use of agricultural land for non-agricultural purposes, at least according to the time period of submission of the request, whether the request was answered positively or negatively, and according to the current status.	<b>M</b>
<b>CSS.12.176</b>	SALMIS shall enable graphical visualization of submitted requests for the use of agricultural land for non-agricultural purposes.	<b>M</b>
	<b>Construction of buildings on agricultural land</b>	
<b>CSS.12.177</b>		<b>M</b>

	SALMIS shall enable the submission of an online request for the construction of greenhouses, facilities for the promotion of agricultural products, facilities for sports and recreational activities and auxiliary facilities, as well as facilities for the primary processing of agricultural products. The Supplier shall develop a configurable module that enables MAFWE to define and update the list of documents required for the application (e.g., adding new or removing existing documents), in accordance with the documents prescribed by the Minister under the applicable legislation.	
<b>CSS.12.178</b>	SALMIS shall allow the applicant to attach all required documentation in digital format, including: property certificate, cadastral plan extract, ELS confirmation, lease agreement, ID card, power of attorney (if applicable), and later phases like investment program, architectural plans, and project documentation.	<b>M</b>
<b>CSS.12.179</b>	SALMIS shall support the initial validation and review of submitted requests by authorized MAFWE staff and allow feedback to applicants if documents are missing or incomplete.	<b>M</b>
<b>CSS.12.180</b>	SALMIS shall enable the MAFWE to process submitted requests, including automated routing to responsible units, and adopt a decision to issue or reject consent within the legally prescribed deadline.	<b>M</b>
<b>CSS.12.181</b>	SALMIS shall include a module for structured communication between MAFWE and external institutions (e.g., utility providers, ministries, local governments), allowing sending and receiving of responses related to infrastructure, land use, and environmental conditions relevant to the construction.	<b>M</b>
<b>CSS.12.182</b>	SALMIS shall generate official building consent decisions (signed digitally), notify relevant stakeholders (local governments, cadastre agency, etc.), and automatically include the approved object in the graphical registry of state-owned land.	<b>M</b>
<b>CSS.12.183</b>	SALMIS shall allow the applicant to appeal the decision received from the MAFWE.	<b>M</b>
<b>CSS.12.184</b>	SALMIS shall allow filtering of the database of submitted requests for construction of buildings on agricultural land, at least according to the time period of submission of the request, whether the request was answered positively or negatively, and according to the current status.	<b>M</b>
	<b>Approval of legalization of agricultural land</b>	
<b>CSS.12.185</b>	<p>SALMIS shall support the procedure for approval of legalization of facilities constructed on agricultural land without prior consent, in cases and under conditions explicitly prescribed by the Law on Agricultural Land. This procedure applies exclusively to greenhouses, auxiliary facilities, and facilities for primary processing of agricultural products that were constructed illegally by 14 February 2011 and for which legalization is legally permitted.</p> <p>Within this scope, SALMIS shall function as a centralized electronic register and workflow system, enabling municipalities to submit legalization requests, supporting MAFWE in the assessment and decision-making process, and ensuring systematic record-keeping, traceability, and reporting of all submitted, approved, and rejected legalization cases, without extending or modifying the legal framework governing legalization.</p>	<b>I</b>

<b>CSS.12.186</b>	SALMIS shall enable municipalities to submit a request for legalization of greenhouses, auxiliary facilities and facilities for primary processing of agricultural products that have been illegally built on agricultural land by 14 February 2011 .	<b>M</b>
<b>CSS.12.187</b>	SALMIS shall enable the MAFWE to issue approval or reject the request for legalization, depending on whether the illegally constructed facility meets the requirements for legalization under the Law on Agricultural Land.	<b>M</b>
<b>CSS.12.188</b>	SALMIS shall allow for keeping records of all submitted legalization requests, all issued approvals, and all rejected requests.	<b>M</b>
<b>CSS.12.189</b>	SALMIS shall allow filtering of the database of legalization requests at least by municipality, time period from date to date and request status (approved/rejected).	<b>M</b>
	<b>Contract for use of pastures</b>	<b>M</b>
<b>CSS.12.190</b>	<p>SALMIS shall support the legally prescribed procedures related to the management and use of state-owned pastures, in accordance with the applicable legislation and within the competencies of the Public Enterprise for Management of Pastures (PEMP).</p> <p>Within this scope, SALMIS shall support the recording and management of relevant data related to pasture use, including contracts and related information, while ensuring interoperability and data exchange with systems operated by PEMP, where applicable.</p> <p>The system shall not replace or replicate the managerial, financial, or operational functions of PEMP, but shall act as a supporting information system for data registration, monitoring, and reporting purposes.</p> <p>The system shall enable the management of alphanumeric and, where applicable, geospatial data related to pastures, support transparency of allocation procedures, and ensure traceability of key contractual and procedural information.</p>	<b>I</b>
<b>CSS.12.191</b>	SALMIS shall enable the establishment and maintenance of a register of state-owned pastures.	<b>M</b>
<b>CSS.12.192</b>	The pasture register shall contain alphanumeric data and, where applicable, associated spatial (graphical) data representing the location and extent of state-owned pastures	<b>M</b>
<b>CSS.12.193</b>	SALMIS shall be able to maintain a codebook of pasture use purposes.	<b>M</b>
<b>CSS.12.194</b>	SALMIS shall be able to maintain a codebook of pasture classifications.	<b>M</b>
<b>CSS.12.195</b>	SALMIS shall maintain a codebook of pasture grazing productivity (carrying capacity), defined as the number of livestock units that a pasture area can sustainably support.	<b>M</b>
<b>CSS.12.196</b>	SALMIS shall be able to maintain a price list for the use of pastures, with a price per unit of measure determined for each purpose.	<b>M</b>
<b>CSS.12.197</b>	SALMIS shall enable the PEMP to conclude agreements for the use of pastures by legal entities and individuals through a public announcement or in a procedure without publishing a public announcement, depending on the capacity of the pasture.	<b>M</b>
<b>CSS.12.198</b>	SALMIS shall store and manage data on pasture carrying capacity, defined in accordance with the applicable legislation as the number of livestock units that can be grazed per hectare.	<b>M</b>

<b>CSS.12.199</b>	SALMIS shall enable the management and storage of records for public announcements for the granting of use of state-owned pastures.	<b>M</b>
<b>CSS.12.200</b>	The public notice shall contain, in accordance with the applicable legislation, at least the following data: <ul style="list-style-type: none"> <li>– Reference to the location where cadastral data are made publicly available;</li> <li>– Capacity of the pastures to be used</li> <li>– Duration for which the pastures are to be used</li> <li>– Total area in Ha to be used</li> <li>– Deadline for submitting bids</li> <li>– Amount of compensation according to the valid price list</li> <li>– Required documentation for application</li> </ul>	<b>M</b>
<b>CSS.12.201</b>	SALMIS shall enable the keeping and storage of records for the members of the commission responsible for implementing the procedure for granting use of state-owned pastures.	<b>M</b>
<b>CSS.12.202</b>	SALMIS shall allow for the submission of online applications for the use of state-owned pastures.	<b>M</b>
<b>CSS.12.203</b>	SALMIS shall allow for the upload of all required application documentation: <ul style="list-style-type: none"> <li>– Property certificate not older than 3 months</li> <li>– A statement on the type and number of livestock certified by a notary or submit a document on the number of livestock from a competent institution</li> <li>– A confirmation from the competent local government unit that the parcels subject to the request are not in an urban area</li> </ul>	<b>M</b>
<b>CSS.12.204</b>	SALMIS shall allow for upload of the record from conducted on-site inspection	<b>M</b>
<b>CSS.12.205</b>	SALMIS shall support the registration and management of contracts for the use of pastures, in accordance with the applicable legislation and existing administrative practices. <p>The system shall allow the association of land parcels with contracts. Relevant cadastral information shall, where available, be automatically retrieved through integration with AREC information systems and maintained as part of the contract record. Manual entry of cadastral attributes shall be limited to exceptional cases where such information cannot be obtained electronically.</p> <ul style="list-style-type: none"> <li>– Land subject to the contract, including references to cadastral information where required (such as cadastral department, cadastral municipality, parcel number and sub-number, property list number, parcel area, cadastral culture, cadastral class, and named place);</li> </ul>	<b>M</b>

	<ul style="list-style-type: none"> <li>- Number of contract,</li> <li>- Purpose of contract;</li> <li>- Type of contract;</li> <li>- Date of contract;</li> <li>- Effective date;</li> <li>- Expiration date;</li> <li>- Branch office;</li> <li>- Rent;</li> <li>- Rent Value.</li> </ul> <p>Where applicable, standardized codebooks shall be used to ensure data consistency.</p> <p>The system shall allow the association of multiple purposes within a single contract, where permitted by the applicable procedures.</p>	
<b>CSS.12.206</b>	<p>SALMIS shall provide a Lessee entry for the contracts to use pastures with at least following attributes:</p> <ul style="list-style-type: none"> <li>- Name/ Company name;</li> <li>- Surname;</li> <li>- ID number/Company ID number;</li> <li>- VAT number;</li> <li>- Telephone;</li> <li>- E-mail;</li> <li>- Local self-government unit;</li> <li>- Inhabited place;</li> <li>- Address</li> </ul>	<b>M</b>
<b>CSS.12.207</b>	SALMIS shall allow for upload of all documents related with the contract.	<b>M</b>
<b>CSS.12.208</b>	<p>SALMIS shall provide documents in the central database in electronic form that are an integral part of the contracts to use pastures (made in paper form) with at least following attributes:</p> <ul style="list-style-type: none"> <li>- Description of the document;</li> <li>- Document name;</li> <li>- Document type (defined codebook with document types);</li> </ul> <p>Possibility to import different types of documents (.doc, .xls, .txt, .pdf, .dwg/dxf, dgn, .jpg and others).</p>	<b>M</b>
<b>CSS.12.209</b>	<p>SALMIS shall provide a contract to use pastures Annex entry with at least following attributes:</p> <ul style="list-style-type: none"> <li>- Annex number;</li> <li>- Date of annex;</li> <li>- Date of taking possession of the annex;</li> <li>- Expiry date of the annex;</li> <li>- Attaching documents in electronic form.</li> </ul> <p>After entering the annex in the application, it is necessary to be able to change all previously entered data of the contracts to use pastures (parcels, areas, rent value, purpose of lease, Lessee).</p>	<b>M</b>
<b>CSS.12.210</b>	SALMIS shall provide a Termination of contracts to use pastures entry with at least following attributes:	<b>M</b>

	<ul style="list-style-type: none"> <li>- Type of contracts termination;</li> <li>- Number of legal document;</li> <li>- Date of legal document;</li> <li>- Effective date;</li> <li>- Attaching documents in electronic form.</li> </ul>	
	<ul style="list-style-type: none"> <li>- Payment for the year;</li> <li>- Amount of payment;</li> <li>- Currency;</li> <li>- Date of payment.</li> <li>- Attaching documents in electronic form.</li> </ul> <p>Payments are entered once a year while the contracts is active.</p>	
<b>CSS.12.211</b>	SALMIS shall allow for more than one purpose to be included in a single agreement for the use of state-owned pastures.	<b>M</b>
<b>CSS.12.212</b>	SALMIS shall enable data exchange with the FVA information system, from where data on the number and type of livestock owned by the applicant will be downloaded.	<b>M</b>
<b>CSS.12.213</b>	SALMIS shall enable data exchange with FR, the Register of Trade Companies maintained in the CRNM, and the Central Population Register maintained in the MDT.	<b>M</b>
<b>CSS.12.214</b>	The commission ranks the most favorable bids for the use of pastures according to the highest percentage of filling the advertised pasture, prepares minutes of the bid opening, an evaluation report and a proposal for selecting the most favorable Supplier.	<b>M</b>
<b>CSS.12.215</b>	SALMIS shall allow sending email notifications about the selection of the most favorable offer to all Suppliers.	<b>M</b>
<b>CSS.12.216</b>	Suppliers who are dissatisfied with the decision have the right to file an appeal with a competent court.	<b>M</b>
<b>CSS.12.217</b>	SALMIS shall allow for the upload of all documents related to/created in the procedure for granting use of state-owned pastures.	<b>M</b>
<b>CSS.12.218</b>	SALMIS shall allow online submission of requests for the use of state-owned pastures that have not been published in a public announcement.	<b>M</b>
<b>CSS.12.219</b>	PEMP may conclude contracts for the provision of pasture use without publishing a public announcement until the pasture capacity is exhausted.	<b>M</b>
<b>CSS.12.220</b>	For the use of the pastures, the user is obliged to pay compensation in accordance with the contract concluded with PEMP.	<b>M</b>
<b>CSS.12.221</b>	SALMIS shall allow sending information to PEMP when the user is late with payment according to the contract and a reminder to the user who is late with payment.	<b>M</b>
<b>CSS.12.222</b>	SALMIS shall calculate interest on late payments and additionally debit the user with the calculated interest.	<b>M</b>
<b>CSS.12.223</b>	SALMIS shall allow filtering of the database of agreements for the use of state-owned pastures at least by time period from date to date, by advertisement number, by user and by purpose of the pastures.	<b>M</b>
<b>CSS.12.224</b>	<p>SALMIS shall enable searching for entered contracts for the use of pastures according to various parameters:</p> <ul style="list-style-type: none"> <li>- Contract number;</li> <li>- Type of contract;</li> <li>- Purpose of contract;</li> <li>- Lessee;</li> </ul>	<b>M</b>

	<ul style="list-style-type: none"> <li>– ID number/Company ID number;</li> <li>– VAT number;</li> <li>– Cadastral parcel number;</li> <li>– Cadastral municipality;</li> <li>– Cadastral department;</li> <li>– Contract completion date;</li> <li>– Units of local self-government;</li> <li>– Contracts that are exempt from payment;</li> <li>– Active/inactive contracts;</li> <li>– Paid/unpaid liabilities on an annual basis;</li> <li>– Number of bank guarantee;</li> <li>– Bank guarantees that expire</li> </ul>	
	<b>Module for sending reminders and alerts</b>	
<b>CSS.12.225</b>	SALMIS shall provide a configurable reminder and alerting mechanism for notifying users about time-critical events, obligations, and procedural milestones related to land management processes.	<b>M</b>
<b>CSS.12.226</b>	Reminders and alerts shall be delivered through at least the following channels: <ul style="list-style-type: none"> <li>– internal notification mechanism within the SALMIS application;</li> <li>– electronic mail (email).</li> </ul>	<b>M</b>
<b>CSS.12.227</b>	Access to reminders and alerts delivered through the internal notification mechanism shall require authenticated access to the SALMIS application using a valid username and password.	<b>M</b>
<b>CSS.12.228</b>	Users shall be able to receive and view reminders and alerts delivered via email without being logged into the SALMIS application.	<b>M</b>
<b>CSS.12.229</b>	Users with administrative privileges shall be able to configure reminder and alert rules, including triggering events, delivery channels, recipients, and timing (e.g. advance notice periods).	<b>M</b>
<b>CSS.12.230</b>	End users shall be able to configure the reoccurrence and visibility period of reminders delivered through the internal notification mechanism, within limits defined by administrative settings.	<b>M</b>
<b>CSS.12.231</b>	The reminder and alerting mechanism shall support automatic notifications at least for the following events: <ul style="list-style-type: none"> <li>– upcoming expiration of lease agreements;</li> <li>– upcoming expiration of bank guarantees;</li> <li>– late or overdue payments related to lease or sale contracts;</li> <li>– upcoming court hearings or legally relevant procedural deadlines.</li> </ul>	<b>M</b>
<b>CSS.12.232</b>	SALMIS shall support the sending of circular notifications to multiple users simultaneously, based on predefined message templates.	<b>M</b>
<b>CSS.12.233</b>	Authorized users shall be able to create, edit, and manage message templates for reminders, alerts, and circular notifications without requiring software code changes.	<b>M</b>
<b>CSS.12.234</b>	SALMIS shall maintain a complete audit trail of sent reminders and alerts, including recipient, delivery channel, timestamp, and delivery status (successful / failed).	<b>M</b>
	<b>Support for State Agricultural Inspectorate (SAI)</b>	

<b>CSS.12.235</b>	<p>SALMIS shall provide structured, reliable and up-to-date data to support the activities of the State Agricultural Inspectorate (SAI), within its legally defined mandate, primarily by enabling inspectors to access information on lease agreements, land use purposes and spatial data on state-owned agricultural land directly in the field.</p> <p>The role of SALMIS is not to replace or duplicate the existing inspection information system of the SAI, but to complement it by providing authoritative land management data, GIS-based visualization and interoperable services that facilitate timely identification of irregularities and preparation of inspection records on site.</p>	<b>M</b>
<b>CSS.12.236</b>	<p>SALMIS shall provide a web and mobile-enabled interface to allow authorized SAI inspectors to access relevant land and spatial data and, where appropriate, capture field observations, in coordination with existing inspection systems.</p>	<b>M</b>
<b>CSS.12.237</b>	<p>SALMIS shall enable inspectors to access, view and record inspection observations related to:</p> <ul style="list-style-type: none"> <li>– uncultivated agricultural land,</li> <li>– use of agricultural land contrary to the purpose defined in lease or usufruct agreements,</li> <li>– illegal construction on agricultural land,</li> <li>– illegal use of pastures,</li> </ul> <p>based on authoritative data maintained in SALMIS.</p>	<b>M</b>
<b>CSS.12.238</b>	<p>SALMIS shall provide GIS-based visualization of state-owned agricultural parcels, lease boundaries and land use purpose, enabling inspectors to spatially verify compliance directly in the field.</p>	<b>M</b>
<b>CSS.12.239</b>	<p>SALMIS shall expose standardized web services (APIs) to allow the existing SAI information system to retrieve relevant land, contract and spatial data required for inspection and enforcement procedures.</p>	<b>M</b>
<b>Interoperability and Data Exchange</b>		
<b>CSS.12.240</b>	<p>SALMIS does not define its own interoperability architecture.</p> <p>All data exchange mechanisms shall be implemented in accordance with the IAIP Interoperability and Services framework defined in Section 2.5.3.</p> <p>Interoperability and Services.</p> <p>The requirements below specify how SALMIS consumes and exposes services within that framework.</p>	<b>I</b>
<b>CSS.12.241</b>	<p>SALMIS shall be designed as an interoperable system that exchanges data with other national information systems through standardized, secure and legally compliant mechanisms.</p> <p>Wherever possible, data exchange shall be implemented through the National Interoperability Platform (NIP), in accordance with the National Interoperability Framework and applicable technical recommendations.</p> <p>For institutions or systems not connected to the NIP, SALMIS shall expose purpose-built APIs or, where explicitly agreed, enable controlled database-level integration.</p>	<b>M</b>
<b>CSS.12.242</b>	<p>SALMIS shall exchange data with at least the following information systems:</p>	<b>M</b>

	<ul style="list-style-type: none"> <li>– MAFWE – Farm Register (FR)</li> <li>– CRNM – Trading Companies Register</li> <li>– MDT – Central Population Register</li> <li>– AREC – eKat (Cadastral parcels and buildings)</li> <li>– AREC – NSDI portal (INSPIRE-compliant agricultural datasets)</li> <li>– AFSARD – IACS (Subsidies)</li> <li>– Food and Veterinary Agency (FVA) – Animal Register</li> <li>– Ministry of Finance (where applicable)</li> </ul> <p>SALMIS shall primarily use verified data available through the Farm Register, avoiding duplication of direct integrations where not necessary. Integration with the Ministry of Finance (where applicable) shall aim to enable automated retrieval of payment confirmations or treasury statements related to lease contracts and other relevant agreements, subject to technical and institutional feasibility.</p>	
<b>CSS.12.243</b>	SALMIS shall provide system-level web services (APIs) enabling other authorized applications and databases to consume SALMIS data.	<b>M</b>
<b>CSS.12.244</b>	SALMIS shall provide INSPIRE-compliant network services (view, download, and transformation services) for agricultural land datasets.	<b>M</b>
<b>CSS.12.245</b>	<p>Data exchange with institutions connected to the NIP shall be implemented in accordance with the technical recommendations for connection and data exchange through the NIP:</p> <p><a href="https://mioa.gov.mk/sites/default/files/pbl_files/documents/20150515_iop-t_v1.0_final.pdf">https://mioa.gov.mk/sites/default/files/pbl_files/documents/20150515_iop-t_v1.0_final.pdf</a>;</p> <p><a href="https://mioa.gov.mk/sites/default/files/pbl_files/documents/20150813_iop-t_v1.0_annex.pdf">https://mioa.gov.mk/sites/default/files/pbl_files/documents/20150813_iop-t_v1.0_annex.pdf</a></p>	<b>M</b>
<b>CSS.12.246</b>	Connection to IT systems from institutions that are not connected to the NIP shall be realized through purpose-developed API functions or by direct connection at the database level.	<b>M</b>
<b>CSS.12.247</b>	SALMIS shall provide the State Agricultural Inspectorate (SAI), as the authorized inspection body, with access to relevant alphanumeric and spatial data through standardized services and role-based access, without duplicating or replacing existing inspection or enforcement information systems.	<b>M</b>
	<b>Reporting and Analytics Module</b>	
<b>CSS.12.248</b>	<p>SALMIS shall allow the creation of reports from the entered data. At least the following reports shall be provided:</p> <ul style="list-style-type: none"> <li>– How many parcels are under lease at the country level</li> <li>– How many Ha are leased</li> <li>– How many contracts expire in the given time period from start date to end date</li> <li>– How many parcels and parts of parcels of land are given for a certain purpose of lease of arable agricultural land</li> <li>– How many agreements/contracts are given for use for a specific purpose</li> <li>– Which state-owned arable agricultural parcels are available for lease as per status in AREC</li> <li>– Which state-owned pastures are available for use as per status in AREC</li> <li>– How much area of arable agricultural land under lease does a legal/natural person have</li> </ul>	<b>M</b>

	<ul style="list-style-type: none"> <li>– What is the annual rent for a certain purpose of the arable agricultural land</li> <li>– How many of the contracts were concluded with young farmers up to 40 years</li> <li>– How much rent was charged for a particular year</li> <li>– How many contracts are subject to litigation for untimely rent payments.</li> </ul> <p>Exhaustive list of reports will be prepared in close cooperation with the Client.</p>	
<b>CSS.12.249</b>	In addition to predefined reports, the application shall allow for dynamic creation of reports during application execution (in runtime environment).	<b>M</b>
<b>CSS.12.250</b>	SALMIS shall enable users to create custom reports by selecting tables, fields, filters and groupings	<b>M</b>
<b>CSS.12.251</b>	SALMIS shall support users to apply filters and parameters to reports at runtime	<b>M</b>
<b>CSS.12.252</b>	SALMIS shall support exporting of resulting data sets into the most popular file formats (XLSX, CSV, PDF, DOCX etc.) for direct usage and/or further data processing and preparing of ad-hoc reports.	<b>M</b>
<b>CSS.12.253</b>	Reports that are created dynamically shall be able to be saved for later use or deleted, if necessary.	<b>M</b>
<b>CSS.12.254</b>	<p>SALMIS shall allow the creation of dashboards from the entered data. At least following dashboards need to be created and put in function internally, externally via open web access:</p> <ul style="list-style-type: none"> <li>– dashboard for displaying the number of parcels and parts of parcels of arable agricultural land leased by the MAFWE in the area of a municipality/branch office</li> <li>– dashboard for displaying the total area of leased arable agricultural land by the MAFWE per municipality/branch office</li> <li>– dashboard for displaying the total area of pastures leased by municipality/branch office</li> <li>– dashboard for displaying the total area leased by cadastral crop</li> <li>– dashboard for displaying the total area of pastures leased by purpose of lease</li> </ul> <p>Exhaustive list of dashboards will be prepared in close cooperation with the Client.</p>	<b>M</b>
<b>CSS.12.255</b>	In addition to predefined dashboards, the application shall allow for dynamic creation of dashboards during application execution (in runtime environment).	<b>M</b>
<b>CSS.12.256</b>	SALMIS shall support the creation of dashboards via a drag-and-drop user interface	<b>M</b>
<b>CSS.12.257</b>	SALMIS shall provide support for variety of chart types (bar, pie, line, heatmaps ...)	<b>M</b>
<b>CSS.12.258</b>	SALMIS shall support authorized users to apply filters and parameters to dashboards at runtime	<b>M</b>
<b>CSS.12.259</b>	Dashboards that are created dynamically shall be able to be saved for later use or deleted, if necessary.	<b>M</b>
<b>CSS.12.260</b>	SALMIS shall support interactive GIS dashboards for advanced GIS-based analytics.	<b>M</b>
	<b>Audit Logs</b>	
<b>CSS.12.261</b>	SALMIS shall keep audit log records for all logins, logouts and for all system data changes.	<b>M</b>

<b>CSS.12.262</b>	Audit logs shall keep at least following info: <ul style="list-style-type: none"> <li>– user who performed the action</li> <li>– date and time when action was done</li> <li>– IP address of the user</li> <li>– database table affected</li> <li>– table record affected</li> <li>– change type</li> <li>– old record value</li> <li>– new record value</li> </ul>	<b>M</b>
<b>CSS.12.263</b>	SALMIS shall support filtering of audit logs data at least per user, per change type, per database table affected and for the time period from date – to date	<b>M</b>

#### 2.5.1.2.4. Registry Management Module – Development of New Registers and Domain-specific datasets

In addition to the modernization and replacement of legacy IT systems described in the previous section, the Integrated Agricultural Information Platform (IAIP) shall support the establishment of new registry modules and domain-specific datasets in areas where the Ministry of Agriculture, Forestry and Water Economy (MAFWE) currently lacks standardized digital solutions.

These registries and domain-specific datasets are mandated by law or by operational needs but are often maintained in manual or fragmented formats such as spreadsheets, paper records, or isolated databases within departments. The absence of standardized IT solutions in these areas creates inefficiencies, reduces transparency, and hinders evidence-based decision-making.

The development of these registries and domain-specific datasets will provide MAFWE with a unified, standardized, and secure digital environment that enables consistent management of all administrative and policy-related registers under its responsibility.

The **main objectives** of the new registry modules and domain-specific datasets are:

- **Standardization** – Ensuring that all new registries and Datasets follow harmonized data models, codebooks, and metadata structures, eliminating inconsistencies across departments.
- **Digitalization of manual processes** – Replacing paper or spreadsheet-based procedures with structured, workflow-driven processes in the IAIP.
- **Transparency and accountability** – Providing secure access, role-based permissions, and audit trails to ensure compliance with legislation and institutional requirements.
- **Interoperability** – Enabling secure exchange of registry data with other national institutions and the National Interoperability Platform through standardized APIs.
- **Monitoring and reporting** – Allowing new registries and Datasets to directly feed into the centralized BI platform, improving monitoring, evaluation, and evidence-based policy making.

To avoid duplication and ensure consistency, the development of new registry modules and Datasets will follow a **generalized approach**:

1. **Common functionalities** – Features that are relevant across all registries and Datasets will be developed as shared services (e.g., online submission of applications, document upload, automated notifications, workflow management).
2. **Registry-specific customization** – Each registry and Dataset will be configured with its specific data model, codebooks, and validation rules, while still relying on the common IAIP framework.
3. **Integration with core IAIP services** – All new registry and Datasets modules will use the Authentication, Authorization, GIS Support, and Data Migration services of the IAIP, ensuring unified user experience and consistent data governance.

By adopting this structured approach, MAFWE will be able to establish approximately 70 legally mandated registries identified in Annex B (including SALMIS registers) within a single platform, while minimizing development effort, avoiding redundancies, and ensuring compliance with interoperability and security standards.

#### **2.5.1.2.4.1. Registry Types and Classification**

The registries to be established and maintained within the Integrated Agricultural Information Platform (IAIP) vary in scope, data type, and operational responsibility. Some are purely alphanumerical, maintained exclusively by MAFWE departments, while others include spatial (GIS) components or require interaction with citizens, businesses, and other public institutions.

A detailed overview of all registries that MAFWE is legally mandated to establish and maintain is provided in **Annex B: MAFWE’s Agricultural Registers**. This annex lists each registry together with its legal basis, responsible department, and current digitalization status, and indicates whether it will be newly developed within the IAIP or integrated from existing IT systems.

For the purposes of IAIP system architecture and technical design, registries are categorized according to the following characteristics. This categorization is applied solely for system modeling, access control configuration, and functional structuring, and does not modify or redefine institutional mandates established by law.

- **By functional scope:** operational (e.g., registries used for direct policy implementation), administrative (e.g., staff or institutional data), and reference (e.g., codebooks and lookup tables);
- **By data type and classification:** alphanumerical or spatial, or both;
- **By user interaction:** internal-only registries (maintained exclusively by MAFWE staff) or citizen/business-facing registries (accepting online submissions and external access via the National Interoperability Platform or without it);
- **By governance level:** registries managed by MAFWE, by agencies under its supervision (e.g., AFSARD, Agency for Food and Veterinary), or by delegated external bodies (e.g., certification authorities).

This classification ensures that all registries are implemented in a consistent manner, while allowing for tailored functionalities where required by their operational or legal characteristics.

The IAIP registry management framework shall be designed as an extensible platform capable of supporting the establishment of additional registries and datasets in the future through configuration of data models, workflows, and codebooks, without requiring fundamental changes to the core system architecture.

**2.5.1.2.4.2. Core Functionalities Applicable to All New Registries**

The following functionalities shall be developed as part of the common IAIP framework and made available across all new registry modules, with applicability depending on the registry type (alphanumeric, spatial, or externally accessible).

The table below summarizes the core functional requirements common to all newly established registries. Additional registry-specific requirements will be defined during the system design phase of the project, based on the characteristics listed in Annex B.

**Registry Management Module – Development of New Registers Detailed Requirements**

Number	Functional Area	Feature	Applicability	Type
CSS.13.01	Online applications and submissions	The IAIP shall allow electronic submission of applications or requests for registration, update, or deregistration, including validation of mandatory fields and required supporting documents.	Citizen/business-facing registries	M
CSS.13.02	Document management	The IAIP shall enable uploading, validation, and secure storage of supporting documents in standard formats (PDF, DOCX, XLSX, JPG, PNG).	All	M
CSS.13.03	Workflow management	The IAIP shall provide configurable workflows for data entry, verification, approval, rejection, and archiving, including hierarchical approval chains.	All	M
CSS.13.04	Notifications	The IAIP shall generate automatic email or in-system notifications to applicants and authorized staff on key workflow stages (e.g., submission, approval, rejection).	All	M
CSS.13.05	Role-based access control (RBAC)	The IAIP shall enforce role-based access control, allowing assignment of permissions by user	All	M

		role (data entry, reviewer, approver, administrator).		
<b>CSS.13.06</b>	Audit trail and logging	The IAIP shall maintain a comprehensive audit trail of all user and system actions (creation, modification, approval, deletion), available for reporting and compliance checks.	All	<b>M</b>
<b>CSS.13.07</b>	Search, filter, and reporting	The IAIP shall allow dynamic search and filtering of records by configurable parameters and support data export to commonly used formats (CSV, XLSX, PDF).	All	<b>M</b>
<b>CSS.13.08</b>	GIS integration	The IAIP shall support integration with the GIS Support Module for map-based visualization, spatial queries, and geographic filtering for registries with spatial components.	Spatially-enabled registries	<b>M</b>
<b>CSS.13.09</b>	Standardized codebooks	The IAIP shall use centralized, standardized codebooks for consistent data entry, with administrative privileges for updating and extending codebook entries.	All	<b>M</b>
<b>CSS.13.10</b>	Data export and interoperability	The IAIP shall enable export of registry data in standardized formats (CSV, XML, JSON) and provide APIs for interconnection with the National Interoperability Platform (NIP) and other systems.	All	<b>M</b>
<b>CSS.13.11</b>	Authentication and authorization integration	The IAIP shall integrate with the national eID, NIP Identity Provider, and IAIP RBAC services for authentication and access management.	All	<b>M</b>
<b>CSS.13.12</b>	Multilingual user interface	The IAIP shall provide multilingual interfaces, supporting at least Macedonian, Albanian and English.	All	<b>M</b>
<b>CSS.13.13</b>	Integration with Data Warehouse and BI Platform	The IAIP shall feed validated registry data into the central Data Warehouse and BI Platform for reporting, monitoring, and evaluation purposes.	All	<b>M</b>

<b>CSS.13.14</b>	Data protection and anonymization	The IAIP shall provide mechanisms for data pseudonymization and anonymization in compliance with GDPR and national data protection regulations.	All	<b>M</b>
<b>CSS.13.15</b>	Data publication and transparency	The IAIP shall support configurable publication of registry data and aggregated indicators through public (Internet) and restricted (Extranet) web interfaces, in accordance with applicable legislation and access control rules.	Registries where publication is legally permitted	<b>M</b>
<b>CSS.13.16</b>	Visualization and monitoring	The IAIP shall provide configurable dashboards and data visualization tools (charts, maps, indicators) for internal monitoring and, where applicable, for public information purposes.	All	<b>M</b>

The development of registry-specific configurations shall not require the creation of new core software modules beyond those defined in this Technical Specification but shall be implemented through configuration of the common IAIP registry management framework.

#### **2.5.1.2.4.3. Registry-Specific Requirements**

While the common IAIP functionalities described in the previous section apply across all new registries **to be established or maintained under the authority of MAFWE**, each individual registry may require additional, domain-specific features, attributes, or operational rules. These specific requirements stem from the underlying legislation, the administrative procedures managed by the responsible organizational units (sectors, departments) within MAFWE, and the nature of the data being collected (alphanumeric or spatial).

**To ensure proper design and implementation, registry-specific requirements shall be documented and validated in close collaboration with the respective MAFWE organizational units during the system design phase.**

The following elements shall be defined for each registry:

##### **1. Registry metadata and governance**

- Official name of the registry, legal basis (law and bylaw), and responsible MAFWE department.
- Type of registry: operational, administrative, analytical or reference.
- Data type: alphanumeric or spatial (with GIS integration).

- Governance level: MAFWE-managed registry, either internally administered or maintained with user interaction from citizens or businesses for registration or data updates.
2. **Data model and key attributes**
    - Core entities and attributes (e.g., registration number, owner, location, classification, status).
    - Relationships with other registries (e.g., Farm Register, LPIS, Organic Production Register).
    - Validation and uniqueness rules (mandatory fields, codebooks, data formats).
    - Frequency and method of updates (real-time, periodic, on request).
  3. **Operational workflows**
    - Registration, verification, approval, and update processes.
    - Specific steps involving citizen or business participation (where applicable).
    - Internal approval hierarchy and role assignments.
    - Required notifications, documents, and reports.
  4. **Integration and interoperability**
    - Required data exchange with other IAIP modules and external systems via the National Interoperability Platform (NIP).
    - Integration with the National Electronic Identification (eID), digital signature, or e-services portal (euslugi.gov.mk) where citizen interaction is foreseen.
    - Linkages with analytical modules (BI platform, Data Warehouse) for monitoring and evaluation purposes.
  5. **Reporting and update cycles**
    - Frequency of data submission or verification (e.g., quarterly, annual, ad hoc).
    - Reporting obligations (e.g., EU reporting, national statistical reporting).
    - Archival and versioning requirements for historical data.
  6. **Specific technical considerations**
    - Need for GIS visualization or spatial validation (for spatially enabled registries).
    - Required file formats and import/export templates.
    - Performance and scalability considerations based on expected data volume.

A **registry-specific configuration sheet** shall be prepared for each new register, summarizing the above elements in a standardized format to be approved by MAFWE prior to development.

This approach ensures that each registry is designed according to its legal and operational context while remaining fully compatible with the IAIP architecture and the shared functional framework.

A detailed list of all MAFWE-managed registries, including their classification, responsible departments, legal references, and planned digitalization status, is provided in **Annex B – MAFWE’s Agricultural Registers**.

## 2.5.2. Data Conversion and Migration

Data conversion and migration represent a critical success factor for the establishment of the Integrated Agricultural Information Platform (IAIP). The quality, completeness, and reliability of migrated data directly affect the operational readiness of the platform, the continuity of business processes, and user confidence in the new system.

Given the scope and complexity of the IAIP, data conversion and migration are not single, uniform activities, but rather a set of controlled and well-defined processes addressing different source systems, data structures, and maturity levels of existing solutions. The migration approach must therefore ensure:

- full data integrity, traceability, and auditability;
- continuity of operations without disruption to MAFWE business processes;
- compliance with legal, organizational, semantic, and technical interoperability requirements; and
- a controlled transition and decommissioning of legacy and temporary systems.

The Supplier shall be responsible for designing, implementing, documenting, and supporting the entire data conversion and migration process, including preparation of migration plans, execution of migration activities, validation of results, user acceptance testing (UAT), and support during the transition period.

For clarity, risk mitigation, and implementation control, data conversion and migration requirements are structured into two distinct but complementary sub-chapters:

- migration from existing legacy systems to IAIP modules; and
- migration from temporary solutions to the SALMIS module.

In addition to the technical migration procedures described in this section, the migration process shall be supported by a structured approach to data quality assurance and reconciliation. The principles, procedures, and governance arrangements related to data quality assessment, cleansing, reconciliation, and acceptance criteria are defined in Section 2.5.3 Data Quality Assurance and Data Reconciliation.

### 2.5.2.1. Migration from Legacy Systems to IAIP Modules

Migration from legacy systems represents a critical phase in the establishment of the Integrated Agricultural Information Platform (IAIP), as it ensures that existing registries, records, and datasets are securely and accurately transferred into the new environment. This process must guarantee full data integrity, traceability, and continuity of operations, preventing any disruption of MAFWE's business processes.

The Supplier shall design and implement a comprehensive migration strategy that includes, at a minimum, the following elements:

- **Data extraction, cleansing, and transformation** – All data from legacy databases, spreadsheets, and other sources shall be extracted, validated, and transformed into the

standardized IAIP data models. This includes resolving duplicates, correcting inconsistencies, and ensuring compliance with approved codebooks, metadata rules, and data quality standards defined by MAFWE.

- **Parallel operation and transitional support** For systems classified as complex or mission-critical, legacy systems and IAIP modules shall operate in parallel for a defined and reasonable transition period, as agreed with MAFWE. This period shall allow validation of migrated data, operational stability testing, and user adaptation. Where required, limited parallel maintenance of legacy systems shall be ensured during the transition phase.
- **Phased decommissioning of legacy systems** – Following successful migration, validation, and user acceptance, legacy systems shall be gradually phased out. Full decommissioning shall be carried out only after acceptance tests confirm that all data has been accurately migrated, reports and processes function correctly, and MAFWE provides written approval to discontinue the old solutions.

The Supplier shall provide complete documentation of the migration process, including data mapping, ETL procedures, validation reports, and acceptance testing results. The Supplier shall also deliver training to MAFWE administrators on migration procedures and provide support throughout the transition phase.

#### Data Migration and Transition Detailed Requirements (Legacy Systems)

Number	Feature	Type
<b>DCM.01.01</b>	The Supplier must provide services and tools to perform the Data Migration and Transition process.	<b>M</b>
<b>DCM.01.02</b>	The Supplier must prepare and deliver a Data Migration Plan and Data Migration Report, including methodology, timeline, responsibilities, rollback procedures, and acceptance criteria (both subject to approval by the AMP Project Director or Sub-Component Leader)	<b>M</b>
<b>DCM.01.03</b>	The Supplier must perform <b>data inventory and mapping</b> , documenting all data sources, structures, and dependencies from legacy systems.	<b>M</b>
<b>DCM.01.04</b>	The migration process must include <b>data cleansing</b> , ensuring removal of duplicates, correction of invalid values, and harmonization of codebooks before loading into IAIP.	<b>M</b>
<b>DCM.01.05</b>	The Supplier must implement <b>ETL (Extract, Transform, Load) procedures</b> , automated where possible, to securely migrate data into the IAIP database.	<b>M</b>
<b>DCM.01.06</b>	All ETL procedures must be fully <b>auditable and logged</b> , including details of records extracted, transformed, rejected, and loaded.	<b>M</b>
<b>DCM.01.07</b>	The Supplier must provide <b>validation reports</b> before and after migration, confirming completeness, accuracy, and consistency of migrated datasets.	<b>M</b>

<b>DCM.01.08</b>	The Supplier must ensure <b>parallel operation</b> of the legacy systems and IAIP during the transition period, as agreed with MAFWE.	<b>M</b>
<b>DCM.01.09</b>	During the parallel operation, mechanisms for periodic synchronization or verification of updated records shall be implemented to ensure no data loss.	<b>M</b>
<b>DCM.01.10</b>	The Supplier must implement a <b>phased decommissioning plan</b> for legacy systems, ensuring no disruption to MAFWE operations.	<b>M</b>
<b>DCM.01.11</b>	The Supplier must establish <b>rollback mechanisms</b> to restore data from legacy systems in case of migration failure or major errors during transition.	<b>M</b>
<b>DCM.01.12</b>	The Supplier must provide <b>user acceptance testing (UAT)</b> and obtain written approval from MAFWE before finalizing migration and decommissioning.	<b>M</b>
<b>DCM.01.13</b>	The Supplier must deliver <b>full documentation</b> of migration processes, ETL scripts, data mappings, and validation results.	<b>M</b>
<b>DCM.01.14</b>	The Supplier must provide <b>training for MAFWE system administrators</b> on migration tools, ETL procedures, and troubleshooting.	<b>M</b>

#### 2.5.2.2. Migration from Temporary Solutions to SALMIS

This sub-chapter addresses the migration of data from temporary and transitional solutions established to support interim business needs, specifically:

- the Temporary Inventory application for state-owned agricultural land and pastures; and
- the Temporary Application for uploading and processing geodetic elaborates related to lease contracts.

Unlike legacy systems, these solutions were not designed as long-term production systems. Their migration therefore involves not only data transfer, but also the creation, validation, and consolidation of authoritative alphanumeric and geospatial datasets within SALMIS.

A key objective of this migration is the creation of a unified, consistent, and legally authoritative graphical layer of leased arable agricultural land and state-owned pastures, based on processed geodetic elaborates and supplementary spatial information. Upon successful migration and validation, the temporary solutions shall be formally phased out.

#### Data Conversion and Migration Detailed Requirements (SALMIS)

Number	Feature	Type
<b>DCM.02.01</b>	The Supplier <b>MUST</b> provide: Data Migration Plan and Data Migration Report, both subject to the AMP Project Director/Sub-Component Leader approval.	<b>M</b>

<b>DCM.02.02</b>	The documents shall be submitted to the Working Group for review and comments. Technical deliverables shall be reviewed and endorsed by the Working Group. Formal approval and adoption of deliverables shall be issued by the Project Director, based on the recommendation of the Working Group.	<b>M</b>
<b>DCM.02.03</b>	The Supplier MUST prepare scripts for data migration from one database to another, while paying attention to the consistency of the data and its structure in the temporary inventory for state-owned agricultural land and pastures.	<b>M</b>
<b>DCM.02.04</b>	During migration, the Supplier MUST create the layer of graphical data on the leasing of agricultural land by processing and extracting spatial data from: <ul style="list-style-type: none"> <li>• Geodetic elaborates uploaded into the Temporary Application for lease contracts administered by MAFWE; and</li> <li>• All available spatial information from the JONGIS WEB system of PEMP, including: <ul style="list-style-type: none"> <li>○ Cadastral parcel numbers for specific types of contracts (e.g., placement of beehives, construction of temporary structures for improved pasture utilization);</li> <li>○ Cadastral municipality information for group grazing contracts in areas near settlements.</li> </ul> </li> </ul>	<b>M</b>
<b>DCM.02.05</b>	The Supplier MUST create a complete graphical layer of actual (ongoing) leased arable agricultural land and leased state-owned pastures in accordance with the “Methodology for Creation of Graphical Layer,” which will be provided as Annex C. This layer must then be migrated and merged with the alphanumeric data from the Temporary Inventory.	<b>M</b>
<b>DCM.02.06</b>	The key for merging alphanumeric and graphical data shall be unique combination of branch office name and leasing contract number, which are present in both systems.	<b>M</b>
<b>DCM.02.07</b>	The graphical data MUST be validated for topological correctness and internal consistency before merging with the alphanumeric data from the Temporary Inventory.	<b>M</b>
<b>DCM.02.08</b>	The Supplier MUST document each processed geodetic elaborate and submit a report/log detailing parcel IDs, source contract numbers, spatial features created, and any issues encountered.	<b>M</b>
<b>DCM.02.09</b>	The Supplier MUST migrate the data to the SALMIS according to pre-defined and approved migration procedures and scripts.	<b>M</b>
<b>DCM.02.10</b>	The Supplier MUST control the migrated graphical and alphanumeric data from the graphical layer and from the temporary inventory for state-owned agricultural land by creating reports from the application and from the database tables.	<b>M</b>
<b>DCM.02.11</b>	The Supplier MUST submit to the MAFWE a migration statement for all migrated data for review and approval. The statement must include at least the following data: <ul style="list-style-type: none"> <li>– Total number of entered lease contracts;</li> <li>– Total number of contracts for using pastures;</li> <li>– Total number of Lessees/users;</li> <li>– Total number of parcels under lease;</li> <li>– Total number of documents.</li> </ul>	<b>M</b>

The Supplier shall be responsible for implementing the technical migration procedures, including data extraction, transformation, validation, and loading into the IAIP environment. Responsibility for the historical correctness and completeness of legacy data remains with the data-owning institutions, while the Supplier shall implement reasonable data cleansing, validation, and reconciliation procedures as defined in this Technical Specification.

**2.5.3. Data Quality Assurance and Data Reconciliation**

The successful implementation of the IAIP requires not only the technical migration of data from legacy systems, but also the establishment of a structured approach to data quality assurance. Given the fragmented nature of the existing information environment within MAFWE and the presence of multiple legacy systems, spreadsheets, and interim data sources, the migration process must ensure that datasets transferred into the IAIP provide a sufficiently reliable basis for operational processes, reporting, and policy monitoring.

This section establishes the principles and procedures for managing data quality risks during the migration and consolidation of legacy datasets. These provisions complement the technical migration requirements defined in Section 2.5.2 Data Conversion and Migration and support the objective of creating a consistent and trustworthy data environment within the IAIP platform.

**2.5.3.1. Data Quality Assessment**

At the beginning of the data migration phase, the Supplier shall conduct a structured assessment of the datasets intended for migration from legacy systems, spreadsheets, and other data sources currently used by MAFWE.

The purpose of this assessment is to provide an objective overview of the current condition of the available data and to identify potential risks that may affect the migration process or the reliability of the resulting IAIP datasets.

The assessment shall include, where applicable, an evaluation of key data quality dimensions, including:

- Completeness of records and required attributes;
- Internal consistency of data values and relationships between datasets;
- Presence of duplicate or conflicting records;
- Structural compatibility with the IAIP data model.
- Accuracy (degree to which data correctly represents real-world values);
- Timeliness (degree to which data is up-to-date and available within required timeframes).

The results of this assessment shall be documented as part of the Data Migration Plan and shall be presented to MAFWE for review and confirmation prior to the execution of large-scale migration activities.

The assessment results shall serve as a basis for defining data quality metrics and thresholds to be applied during data cleansing, validation, and acceptance.

### **2.5.3.2. Data Cleansing and Reconciliation Procedures**

Based on the findings of the data quality assessment, the Supplier shall apply appropriate data cleansing and transformation procedures as part of the migration process described in Section 2.5.2.

These procedures may include, where necessary:

- Removal or consolidation of duplicate records;
- Correction of clearly invalid values or formatting inconsistencies;
- Harmonization of codebooks and reference values in accordance with the approved IAIP data models;
- Alignment of legacy data structures with the standardized entities and attributes defined within the IAIP platform.

Where multiple legacy systems contain overlapping information about the same entities, the migration process shall apply reconciliation rules agreed with MAFWE during the migration planning phase. These rules shall determine the preferred data source or consolidation logic in cases where conflicting records or values are identified.

As part of the data cleansing and reconciliation process, the Supplier shall define and propose quantitative data quality metrics and corresponding thresholds for each data quality dimension. These metrics shall include, at a minimum, measurable indicators such as:

- percentage completeness of required data fields;
- maximum acceptable duplicate record ratio;
- acceptable data error rates;
- timeliness of data availability and update frequency.

The proposed thresholds shall be based on the characteristics and quality of the source datasets and shall be subject to review and approval by MAFWE.

The Supplier shall justify the proposed thresholds based on data profiling results and shall document any limitations or constraints affecting the achievable data quality levels.

The agreed thresholds shall be applied as part of the data validation and acceptance framework for migrated datasets.

The Supplier shall document the applied transformation and reconciliation rules as part of the migration documentation to ensure transparency and auditability of the migration process.

### **2.5.3.3. Validation and Acceptance of Migrated Data**

Prior to finalizing the migration of each dataset, the Supplier shall produce validation reports confirming the results of the migration activities.

These reports shall demonstrate that:

- The migration process has preserved the structural integrity of the source datasets;

- The number of migrated records corresponds to the expected data scope, subject to agreed cleansing rules;
- The resulting datasets comply with the structural and logical requirements of the IAIP data model.

Validation shall also confirm compliance with the agreed quantitative data quality metrics and thresholds defined for each data quality dimension.

In addition to the Supplier's validation procedures, MAFWE may perform independent validation and spot-checking of migrated data, either directly or through a designated third party, in order to verify the accuracy and reliability of the migration results.

The Supplier shall provide access to relevant data samples, validation reports, and supporting documentation to support such verification activities.

Final acceptance of migrated datasets shall be subject to review and approval by MAFWE in accordance with the acceptance procedures defined for the overall system implementation and data migration activities.

#### **2.5.3.4. Management of Data Quality Limitations**

Given the diversity, age, and technical heterogeneity of the existing data sources used within MAFWE, it is recognized that certain legacy datasets may contain data quality limitations that cannot be fully resolved during the migration process without extensive manual intervention.

In such cases, the Supplier shall document the identified data quality limitations and propose appropriate mitigation measures. Such measures may include:

- Controlled migration of datasets with documented limitations;
- Partial migration of datasets that meet minimum structural and integrity requirements;
- Recommendations for post-implementation data improvement activities to be carried out by MAFWE where appropriate.

The final decision regarding the treatment of such datasets shall remain with MAFWE. This approach ensures that the migration process remains transparent, traceable, and aligned with operational priorities, while avoiding unnecessary delays in the overall IAIP implementation.

Acceptance of migrated datasets shall be based on verification that the migration procedures have been correctly executed and that the resulting datasets comply with the agreed structural and validation rules of the IAIP data model. Data quality issues originating from legacy systems and documented during the migration process shall not in themselves constitute grounds for rejection of the migration results.

#### **2.5.4. Interoperability and Services**

### **2.5.4.1. Interoperability Framework**

The Integrated Agricultural Information Platform (IAIP) is not designed as a standalone platform but as a core component of the national Digital Public Infrastructure (DPI). Its effectiveness depends on interoperability with other public sector systems within and beyond the agriculture domain. By establishing standardized, secure, and reliable data exchange mechanisms, the IAIP will ensure that MAFWE's agricultural registries contribute directly to evidence-based policymaking, EU alignment, and transparent public service delivery.

Interoperability will primarily be achieved through the National Interoperability Platform (NIP), operated by the Ministry of Digital Transformation (MDT). All registries and services within the IAIP shall expose standardized APIs (REST/SOAP) that are fully compliant with NIP technical and security requirements. This will allow seamless interconnection with external systems such as the Central Registry, Agency for Real Estate Cadastre (eKat and NSDI portal), Agency for Financial Support of Agriculture and Rural Development (AFSARD), Food and Veterinary Agency (Animal Register), and other state institutions' systems that rely on agricultural data.

For institutions that are not yet connected to the NIP, the IAIP shall provide secure temporary connections such as site-to-site VPN tunnels or dedicated APIs. Such direct interconnection shall be limited to institutions explicitly approved by MAFWE and MDT, and only for transitional purposes until NIP connectivity is established. In all cases, data exchange shall comply with strict information security requirements, including end-to-end encryption, digital signing, and comprehensive audit logging.

#### **2.5.4.1.1. Interoperability with Systems connected to the National Interoperability Platform**

The IAIP will support both machine-to-machine services (system APIs, ETL-based interconnection, automated notifications) and user-facing services (such as web portals, dashboards, and data downloads). The platform shall also comply with Open Geospatial Consortium (OGC) standards for spatial data (WMS, WFS, WCS, WMTS) and the EU INSPIRE Directive, ensuring alignment with national and European spatial data infrastructures, in accordance with the National Spatial Data Infrastructure (NSDI) implementation guidelines issued by the Agency for Real Estate Cadastre (AREC).

By implementing this interoperability framework, MAFWE will reduce duplication of data entry, improve the reliability of shared datasets, and enhance inter-institutional collaboration. Citizens and businesses will also benefit from improved access to agricultural data and services, contributing to transparency and accountability. Importantly, the IAIP will remain future-ready, with the capacity to integrate new national DPI components such as e-Documents, e-Payments, and digital identity (eID) services as they become available.

Electronic connectivity with institutions should take place according to strictly defined procedures and interaction guidelines. These procedures are defined as algorithms – guidelines describing the steps for exchanging data and documents. The selected Supplier shall, in coordination with the administrators of related systems, define and implement the IAIP-side web services required for interoperability, while the actual connection and activation of two-way data exchange with external institutions will depend on their technical readiness and will be coordinated by MAFWE and MDT.

The selected Supplier should develop or invoke the following four main categories of web services:

The first category consists of identification and verification services:

- Status of physical persons (info on physical person – family farm case) – the IAIP system will activate services from the Central Population Register, which are expected to return feedback confirming identification, together with additional data for automatic input into the application. Alternatively, they may respond that the process of identification and verification of the physical person has failed.
- Status of legal entities (info on legal entity – farm holder case) – communication with the services of the Central Register of the Republic of North Macedonia, which are expected to return confirmation of identification along with additional data for automatic input into the application. Alternatively, they may respond that the process of identification and verification of the entity has failed.

The second category includes services for populating or updating IAIP registers with data from sources such as the Food and Veterinary Agency (FVA) and Agency for Financial Support of Agriculture and Rural Development (AFSARD), or through group operations initially triggered by related institutions. The update method will be chosen depending on the volume and frequency of the updated data, taking into account required performance and security standards. Essentially, a so-called activation system will be used, where the source/related institution triggers an update procedure in the IAIP system at the moment of a change affecting the IAIP registers. In this way, the IAIP register is continuously updated with the latest data from the sources. Alternatively, a pull system may be used, where, at the moment of data entry into the IAIP, verification is performed, and the required (missing, new, updated) data is retrieved from the source.

The third category includes services by which the IAIP system informs the connected institutions - There are two alternatives: a) notification to the connected institution when it needs to perform certain checks or procedures, and b) sharing of information or generated data (mostly in bulk) after a procedure has updated the IAIP system. In principle, all such information should be stored only in the IAIP system, but in certain situations, exceptions may be made to allow data retrieval for further processing in the connected institution, where both parties must ensure all required services for permanent synchronization and alignment of data stored in both locations.

The fourth category consists of interoperability services with the Agency for Cadastre - These include a significant number of important and demanding services in both directions, for which the selected Supplier, as part of the system analysis together with the MAFWE team, must create a separate list and description of the method of data exchange.

To ensure the necessary security and protection of personal data, electronic data exchange processes must be conducted through the National Interoperability Platform of the Ministry of Digital Transformation, whose infrastructure will host, maintain, and implement the planned web services.

For successful implementation of interaction through the Interoperability Platform, the following prerequisites must be met:

- The IAIP system must meet the minimum technical requirements for providing a communication client, comply with the legal provisions of the Law on Electronic Management and Electronic Documents and its bylaws, and fully adhere to the guidelines for connecting with the Interoperability Platform.
- Institutions with which the IAIP must exchange data should be connected to the platform, if not already connected.
- The development teams of the IAIP system and the information system of the connected institution must define the specific services and data sets to be exchanged

According to current practice, for the needs of the Interoperability Platform, MDT will install equipment and services (so-called adapter) on MAFWE premises. The equipment on which this adapter and corresponding services will be installed will be managed by MDT, and maintenance is MDT's responsibility. Additionally, as part of the equipment for this subsystem (which must be isolated from MAFWE's IT systems), network equipment will also be provided. The interoperability communication client (adapter) is part of the National Interoperability Platform infrastructure and is managed by MDT. IAIP shall integrate with this client but shall not be responsible for its management or maintenance.

Given that upgrades of the information systems of all connected institutions are necessary to meet the IAIP system requirements, it is expected that connectivity with each institution and system will be carried out according to their respective circumstances. This means that the entire interaction process via the Interoperability Platform must be carried out gradually and within appropriate timeframes. Connectivity with partner institutions shall be implemented in a phased manner, based on institutional readiness and formal coordination mechanisms. A structured inter-institutional action plan shall be prepared in coordination with MDT.

At the same time, all involved parties are obliged to provide conditions for data exchange/service use through the Interoperability System, so that all requests and responses are signed with digital certificates. The obligation to digitally sign all requests and responses shall be formalized through inter-institutional data exchange agreements and monitored in accordance with the governance rules of the National Interoperability Platform.

Furthermore, when defining and implementing interoperability activities, the selected Supplier should also take into account the secondary legislation to be adopted under the new Law on Agriculture governing the operation of the IAIP system.

Therefore, during the business analysis phase, all new elements must be updated in the URS (User Requirements Specification) and in the Functional Specification, and based on these, the web services and other procedures and functionalities related to interoperability must be developed.

### **Interoperability and Services – Detailed Requirements**

<b>Number</b>	<b>Feature</b>	<b>Type</b>
<b>CSS.14.01</b>	The IAIP shall expose standardized web services (REST and SOAP) for all registries and modules.	<b>M</b>
<b>CSS.14.02</b>	All published web services shall be fully compliant with the National Interoperability Platform (NIP) standards and security	<b>M</b>

	requirements, as defined by the Ministry of Digital Transformation (MDT).	
<b>CSS.14.03</b>	The IAIP shall support secure authentication and authorization for all web services, including integration with the national eID system for identity verification of external stakeholders.	<b>M</b>
<b>CSS.14.04</b>	The IAIP shall log all API calls and web service requests, including timestamp, source IP, requesting institution, and type of operation, with full auditability.	<b>M</b>
<b>CSS.14.05</b>	The IAIP shall ensure that data exchange through APIs and web services is encrypted in transit (TLS 1.2 or higher, including future versions of the protocol as adopted by MDT security policies).	<b>M</b>
<b>CSS.14.06</b>	The IAIP shall support both synchronous (real-time) and asynchronous (batch) data exchange, depending on the needs of external institutions.	<b>M</b>
<b>CSS.14.07</b>	Where institutions are not yet connected to the NIP, the IAIP shall provide secure site-to-site connections or controlled APIs to ensure interoperability.	<b>M</b>
<b>CSS.14.08</b>	The IAIP shall provide OpenAPI/Swagger documentation for all exposed APIs, including details of endpoints, parameters, and expected outputs.	<b>M</b>
<b>CSS.14.09</b>	The IAIP shall include a service monitoring dashboard for administrators, showing availability, usage statistics, and error logs for each API/web service.	<b>P</b>
<b>CSS.14.10</b>	The IAIP shall provide secure APIs for integration with national e-Documents services, enabling exchange of digitally signed contracts, certificates, and official documents.	<b>M</b>
<b>CSS.14.11</b>	The IAIP should ensure backward compatibility of APIs (versioning strategy) so that external systems are not disrupted when services are updated.	<b>P</b>
<b>CSS.14.12</b>	The IAIP should provide mechanisms for testing APIs (sandbox environment) available to partner institutions before going into production.	<b>P</b>
<b>CSS.14.13</b>	The IAIP shall provide mechanisms for publication of selected non-confidential and legally publishable datasets through public web services and/or open data portals, in machine-readable formats (e.g., CSV, JSON, XML), in accordance with national Open Data legislation and data protection rules.	<b>M</b>
<b>CSS.14.14</b>	Where legally permitted, the IAIP should expose dedicated public APIs for access to approved open datasets, separated from restricted interoperability services and secured against misuse.	<b>P</b>

The implementation of the interoperability framework will ensure that the IAIP functions as an integral part of North Macedonia's Digital Public Infrastructure. By establishing secure, standardized, and transparent data exchange mechanisms, MAFWE will strengthen inter-institutional coordination, improve data quality, and support evidence-based agricultural

policymaking, while maintaining readiness for interoperability with future national e-services and EU-compliant platforms.

The IAIP interoperability architecture will also serve as a reusable model for other sectoral information systems within North Macedonia’s Digital Public Infrastructure.

#### 2.5.4.1.2. Interoperability with Systems Outside the National Interoperability Platform

IAIP shall provide secure and standardized mechanisms for the collection, transformation, and transfer of data from systems that are not connected to the National Interoperability Platform to the analytical data repository (Data Warehouse), which shall form an integral part of the IAIP architecture, enabling these data to be analyzed and processed by the Business Intelligence platform (BI).

- Web services/APIs – All interfaces shall be based on standardized web services and Application Programming Interfaces (APIs), compliant with information security standards. APIs will enable automated, near real-time data exchange between the IAIP, external systems, and the BI platform.
- File upload and processing – Where APIs are not feasible or not yet available, a secure file upload mechanism shall be provided as an alternative. Uploaded files (e.g., CSV, XLSX, XML, JSON) will undergo validation, transformation, and error reporting before integration. File upload should remain a secondary option and used only when automated interfaces are not possible.

The detailed functional requirements for data collection interfaces will be specified per system connection, ensuring harmonization of input data structures, metadata, and codebooks across all IAIP and BI components.

#### Interoperability with Systems Outside the NIP Detailed Requirements

Number	Feature	Type
CSS.15.01	<p>The IAIP shall enable automated data exchange with the following external information systems, subject to technical readiness and formal data exchange arrangements:</p> <ul style="list-style-type: none"> <li>• FADN</li> <li>• Phytosanitary Information System (PIS)</li> <li>• Veterinary Information System</li> <li>• IACS / IPARD Application System</li> <li>• Public Enterprise for Water Management</li> <li>• Forestry Information System etc.</li> <li>• Public Enterprise for Management of Pastures (PEMP) – through interoperability with the JonGIS system for the purpose of exchanging lease-related and relevant spatial and alphanumeric data, where technically feasible.</li> </ul>	M
CSS.15.02	<p>The IAIP shall enable secure and controlled integration with external information systems for the purpose of collecting and exchanging data required for analytical processing and reporting.</p>	M

<b>CSS.15.03</b>	The system shall support integration with external systems that are not connected to the National Interoperability Platform through secure application interfaces.	<b>M</b>
<b>CSS.15.04</b>	The IAIP shall provide mechanisms for automated data ingestion from external systems, including batch and near real-time data exchange.	<b>M</b>
<b>CSS.15.05</b>	The integration layer shall support standard integration protocols including REST APIs, SOAP Web Services, HTTPS, and secure file transfer mechanisms such as SFTP.	<b>M</b>
<b>CSS.15.06</b>	The system shall support data exchange in commonly used structured formats including JSON, XML, and CSV.	<b>M</b>
<b>CSS.15.07</b>	The IAIP integration layer shall support Extract-Transform-Load (ETL) processes for collecting, validating, transforming, and preparing data from external systems before loading them into the Data Warehouse.	<b>M</b>
<b>CSS.15.08</b>	The system shall support configurable data mapping and transformation rules between external data models and the IAIP canonical data model.	<b>M</b>
<b>CSS.15.09</b>	The solution shall support automated validation of incoming data to ensure data integrity, completeness, and consistency prior to storage in the Data Warehouse.	<b>M</b>
<b>CSS.15.10</b>	The system shall provide mechanisms for error handling, including logging, notification, and retry procedures for failed integrations or data transfers.	<b>M</b>
<b>CSS.15.11</b>	The integration layer shall support secure authentication and authorization mechanisms for external systems, including integration with enterprise identity services such as Active Directory or equivalent identity management systems.	<b>M</b>
<b>CSS.15.12</b>	All communication between IAIP and external systems shall be protected using secure transport protocols such as TLS/SSL encryption.	<b>M</b>
<b>CSS.15.13</b>	The system shall provide monitoring and logging capabilities for all integration activities, including message exchange, data processing, and integration errors.	<b>M</b>
<b>CSS.15.14</b>	The system shall provide full audit trail capabilities for integration processes, including tracking of data sources, timestamps, and processing steps.	<b>M</b>
<b>CSS.15.15</b>	The integration layer shall support the transfer of processed data into the IAIP analytical Data Warehouse, enabling further processing, analysis, and visualization through the Business Intelligence platform integrated with IAIP.	<b>M</b>
<b>CSS.15.16</b>	The system shall be designed to support scalable integration with multiple external systems and increasing data volumes without degradation of performance.	<b>M</b>

#### **2.5.4.2. External Dependencies and Interoperability Risk Management**

The effectiveness of the IAIP depends on interoperability with a number of external institutions whose information systems provide essential data required for the functioning of several IAIP modules including BI platform.

The primary mechanism for inter-institutional data exchange is expected to be the National Interoperability Platform (NIP), which provides a standardized framework for secure system-to-system communication between government institutions.

This section defines measures to manage interoperability risks associated with dependencies on external institutions and external information systems.

##### **2.5.4.2.1. IAIP-Side Interoperability Responsibilities**

The Supplier shall design and implement the interoperability interfaces, APIs, and integration services required for the IAIP platform to exchange data with external systems through the interoperability mechanisms defined in this Technical Specification.

This includes:

- Development of required IAIP-side APIs and integration services;
- Implementation of data exchange services compatible with the National Interoperability Platform (NIP);
- Implementation of data exchange services with Systems Outside the National Interoperability Platform
- Preparation of technical documentation describing the IAIP interoperability interfaces.

The Supplier's responsibility is limited to ensuring that the IAIP platform is technically capable of exchanging data through the defined interoperability interfaces.

##### **2.5.4.2.2. Interim Data Exchange Mechanisms**

Recognizing that the availability and readiness of external systems and interoperability infrastructure may evolve during the implementation period, the IAIP platform shall support the possibility of interim data exchange mechanisms where necessary.

Such mechanisms may include:

- Scheduled batch data exchanges;
- Secure file-based data transfers between institutions;
- Periodic data import/export procedures agreed with the relevant institutions.

These mechanisms are intended to enable the continued operation of IAIP modules that depend on external datasets until full interoperability through the National Interoperability Platform becomes operational.

#### **2.5.4.2.3. Inter-Institutional Coordination**

MAFWE shall coordinate with relevant public institutions responsible for external information systems in order to support the implementation of interoperability arrangements required for the IAIP platform.

Where appropriate, such coordination shall include:

- Confirmation of interoperability requirements;
- Agreement on data exchange formats and protocols;
- Coordination of technical timelines for system integration.

These arrangements will be formalized through appropriate mechanisms for inter-institutional cooperation whereby:

- MAFWE shall establish a formal inter-institutional coordination framework for the implementation of IAIP interoperability requirements, involving all key external institutions.
- Such coordination shall be formalized through appropriate mechanisms (e.g. Memoranda of Understanding, inter-institutional agreements, or equivalent instruments), defining roles, responsibilities, and expected timelines for the provision of required data and services.
- The coordination framework shall be established during the early implementation phase and shall support the alignment of technical and operational readiness across participating institutions.
- Shall, in coordination with relevant external institutions, define indicative readiness timelines for the availability of required data exchanges and interoperability services.
- These timelines shall be used to support implementation planning and to identify potential risks related to delays in external system readiness.
- The Supplier shall take such timelines into account when preparing and updating the implementation schedule, including the use of interim data exchange mechanisms where necessary.

Note: The use of interim data exchange mechanisms shall be continuously reviewed, and such mechanisms shall not be considered a permanent solution unless explicitly agreed, in order to avoid long-term impacts on data quality and operational reliability.

#### **2.5.4.2.4. Acceptance of Interoperability Interfaces**

For the purposes of system acceptance, interoperability readiness shall be assessed based on the availability and functionality of the IAIP-side interoperability interfaces developed by the Supplier.

The acceptance of the IAIP platform shall therefore distinguish between:

- Technical readiness of IAIP integration services, which falls under the Supplier's responsibility; and

- Operational interoperability with external institutions, which depends on the readiness of the respective external systems.

This distinction ensures that delays or constraints related to external institutional systems do not constitute non-performance of the Supplier, provided that the IAIP interoperability interfaces have been correctly implemented and documented.

The implementation of interoperability through the National Interoperability Platform (NIP) shall take into account the current development status and availability of the NIP infrastructure.

In the event that some of the NIP functions for data exchange are not fully operational or available within the required implementation timeframe, the Supplier shall implement appropriate interim data exchange mechanisms, including batch data exchange, secure file transfer, or equivalent solutions.

Such interim mechanisms shall ensure continuity of operations, while maintaining compatibility with future NIP integration and minimizing long-term operational and data quality risks.

### **2.5.5. Licensing**

The Supplier is obligated to deliver the software to MAFWE as a License covering all modules, users, executable codes, scripts, configurations, database models, and schemas developed or prepared as part of the IAIP development. The Supplier must clearly state in the offer that the complete solution will be delivered **without any licensing restrictions**, and the system will be handed over to MAFWE **without limitations on the number of users, concurrent users, connections, records, or documents**, or any other form of explicit or hidden restriction (including time-limited usage).

Exceptions to this rule apply exclusively to:

- the **Business Intelligence (BI) software**, for which **10 licenses** shall be provided for **10 concurrent users**, and
- the **Desktop GIS software**, for which **1 administrative license** shall be provided for management of the GIS server platform.

Offers proposing the use of any other licenses, subscription-based or cloud-hosted solutions that impose user or access restrictions will be considered **unacceptable**.

If, for the purpose of IAIP development, the use of additional tools or software components is required, their procurement shall be entirely the responsibility of the Supplier, who must declare and specify such tools in the technical offer.

The Supplier shall deliver the complete source code of the IAIP system, together with all related technical documentation and configuration files. MAFWE shall obtain full rights to operate, maintain, modify, and further develop the delivered system without additional licensing restrictions.

During the implementation and warranty maintenance period, the Supplier shall ensure that the IAIP version is updated as necessary to remain compatible with updates, patches, or upgrades of the underlying IT infrastructure (operating systems, databases, etc.).

## **2.6. Business Intelligence (BI) Platform**

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### **2.6.1. BI Platform Overview**

The Business Intelligence (BI) platform will serve as the analytical layer of the Integrated Agricultural Information Platform (IAIP), enabling the collection, integration, analysis, and visualization of data related to agricultural production, rural development, market activity, and public support measures. The platform will support evidence-based policymaking by providing reliable analytical tools for monitoring sector performance, evaluating policy outcomes, and supporting strategic planning within the agricultural sector.

The IAIP will be closely integrated with a Business Intelligence (BI) platform designed to support comprehensive monitoring, analysis, and reporting across the agricultural sector. The BI platform will combine data from multiple internal IAIP modules and relevant external systems, providing a consolidated analytical environment for decision-makers, analysts, and policy planners.

Through the BI platform, the system will provide:

- Analytical dashboards for real-time monitoring of sector indicators
- Predefined reports for operational monitoring and institutional reporting
- Ad hoc analytical capabilities for deeper policy and performance analysis
- Visualization tools to support interpretation of complex agricultural datasets

The platform will enable advanced analytical capabilities such as multidimensional analysis, trend evaluation, and cross-sector comparisons. These capabilities will allow users to assess relationships between different agricultural indicators, evaluate the effectiveness of public support programs, and monitor long-term developments within the agri-food sector.

The BI platform will support policy analysis, monitoring of agricultural productivity, and assessment of the impact of various support schemes and rural development programs. It will also facilitate the monitoring of key performance indicators related to the Common Agricultural Policy (CAP), enabling alignment with EU monitoring and evaluation frameworks.

To ensure comprehensive sector analysis, the BI platform will integrate data from multiple IAIP modules and relevant external systems, including data related to farm structures, land use, production activities, market transactions, and financial support measures. This integrated data environment will allow the generation of sector-wide analytical insights and support evidence-based decision-making.

To ensure the reliability and consistency of analytical outputs, the BI platform will implement structured data management processes including data extraction, transformation, loading, integration, and automated data quality control mechanisms.

The BI platform will be designed to support different categories of users, including policy makers, analysts, and operational staff within MAFWE and other relevant institutions. Through interactive dashboards and reporting tools, the system will provide flexible analytical capabilities that support both routine monitoring and in-depth analytical investigations.

**2.6.2. BI Platform Components and Services**

The BI platform is expected to include the following modules and components:

BI Modules	Components
BI Portal	<ul style="list-style-type: none"> <li>- Web-based interface for managing and accessing reports</li> <li>- Predefined and ad hoc reports</li> <li>- Dashboards for Monitoring and Evaluation (M&amp;E)</li> </ul>
Data Warehouse	<ul style="list-style-type: none"> <li>- Staging database</li> <li>- Data warehouse</li> <li>- Data modeling and analysis</li> </ul>
Data Collection and Security	<ul style="list-style-type: none"> <li>- Data collection interfaces (web services and APIs)</li> <li>- Secure Data Gateway</li> <li>- File upload &amp; processing</li> </ul>

**Business Intelligence Platform Detailed Requirements**

Number	Feature	Type
<b>BIP.01.01</b>	The BI platform must integrate seamlessly with the IAIP as its primary data source, using staging databases and ETL processes for data preparation.	<b>M</b>
<b>BIP.01.02</b>	The BI platform must provide a centralized data warehouse for consolidated analytical storage, optimized for large datasets and complex queries.	<b>M</b>
<b>BIP.01.03</b>	The platform must provide both predefined reports (aligned with MAFWE’s legal and policy reporting obligations) and ad hoc reporting capabilities for advanced users.	<b>M</b>
<b>BIP.01.04</b>	Dashboards must be configurable, role-based, and support drill-down, filtering, and visualization across multiple dimensions (time, geography, sector).	<b>M</b>
<b>BIP.01.05</b>	The platform must support standard interoperability protocols and provide APIs for external systems to access aggregated data and indicators.	<b>M</b>
<b>BIP.01.06</b>	The BI platform must comply with national information security requirements, ensuring role-based access, encryption, and full audit trails of user interactions.	<b>M</b>
<b>BIP.01.07</b>	The BI platform must provide metadata management for reports and datasets, ensuring traceability of data sources and transformations.	<b>M</b>

<b>BIP.01.08</b>	The solution should support integration with common analytical tools (e.g., R, Python, Excel) for advanced modeling and data science use cases.	<b>M</b>
<b>BIP.01.09</b>	The platform should support offline export of datasets and reports in common formats (CSV, XLSX, PDF, DOCX).	<b>M</b>
<b>BIP.01.10</b>	The BI platform must support multi-language reporting and user interface (Macedonian, Albanian, English).	<b>M</b>

### 2.6.2.1. BI Portal

The BI Portal shall provide access to authorized internal and external users for viewing and generating reports and dashboards.

The portal shall be implemented as a web-based system that is modular in design and shall accommodate changing business needs. It will be integrated with the Integrated Agricultural Information Platform (IAIP) to ensure that all reporting and analytical functions are based on harmonized and validated data. The system shall ensure high availability, scalable design, operational reliability, and strict data and user information security.

When authorized users connect to the BI Portal, the system will open an appropriate dashboard where the user can view available datasets, metadata, and previously created reports. Users will be able to create new reports, select the data for analysis, and perform various operations such as drilling across hierarchies, applying analytical functions, and entering report parameters.

At the end, users may share a report or dashboard with other authorized users and/or export it into standard formats (e.g., MS Excel, PDF).

### BI Portal Detailed Requirements

Number	Feature	Type
<b>BIP.02.01</b>	The BI Portal must provide access to authorized users for viewing and generating reports and dashboards.	<b>M</b>
<b>BIP.02.02</b>	The BI portal must provide facilities to allow content managers to create subscriptions for online content that can be distributed to specific groups of users.	<b>M</b>
<b>BIP.02.03</b>	The BI portal must allow users to personalize their settings.	<b>M</b>
<b>BIP.02.04</b>	The BI portal must link to the Data Warehouse to retrieve data and to store historical backups of its users' content.	<b>M</b>
<b>BIP.02.05</b>	The BI portal must support integration with on-premises authentication systems, such as Active Directory, for secure access to reports and dashboards.	<b>M</b>
<b>BIP.02.06</b>	The BI portal must have capabilities for managing user access, roles, and permissions to control who can view or modify reports and dashboards.	<b>M</b>
<b>BIP.02.07</b>	The BI portal must have capabilities to schedule data refreshes for IAIP-	<b>M</b>

	connected data sources to keep reports up to date.	
<b>BIP.02.08</b>	The BI portal must have customization options for the portal's appearance, including branding elements like logos and color schemes to align with the organization's visual identity.	<b>M</b>
<b>BIP.02.09</b>	The BI Portal shall allow authorized users to create, manage, and share reports and dashboards using the reporting and visualization tools provided within the BI solution.	<b>M</b>
<b>BIP.02.10</b>	The BI portal must have support for accessing reports and dashboards from mobile devices, ensuring a responsive and user-friendly experience on various screen sizes.	<b>M</b>
<b>BIP.02.11</b>	The BI portal must provide granular control over data security, ensuring that sensitive information is protected and only accessible to authorized users.	<b>M</b>
<b>BIP.02.12</b>	The BI portal must provide logging and monitoring features to track user activities, report access, and changes to the system for auditing purposes.	<b>M</b>
<b>BIP.02.13</b>	The BI portal must provide versioning capabilities for reports and dashboards, allowing users to revert to previous versions if needed.	<b>M</b>
<b>BIP.02.14</b>	The BI portal must enable export of reports and dashboards to common formats (e.g., MS Excel, PDF).	<b>M</b>

#### 2.6.2.2. Data warehouse

The data source, such as databases, are expected to use Online Transaction Processing Data Bases (OLTP DB) that are optimized for the inserts, updates and deletes performed by authorized concurrent users of this kind of database. Generation of complex reports is not recommended on transactional databases, because the calculations of aggregates on many related tables in database may significantly decrease the performances of queries and entries by connected users.

Unlike OLTP, Online Analytical Processing database (OLAP DB) is highly de-normalized and is mostly used for analysis and reporting purposes and has the capability to enable business users to generate detailed reports without having a dependence on the IT Department.

Thus, both the historical and aggregated data over different dimensions should be transferred from the operational database to a unified data warehouse, common to all the systems. During transfer of data between systems (OLTP to OLAP), some data will be aggregated (finding sums, averages, minimum, maximum) over different attributes (time: year, quarter, month, week, classifications: economic, function, program, organization hierarchy, etc.) and prepared for quick reporting.

Transfers between systems (the Extract Transform Load – ETL process) should be organized during non-working hours and stored in staging databases which are intermediate database used in the ETL process to temporarily store and process raw data before it is loaded into the final destination - the data warehouse. The functional requirements for a staging database are designed to support the smooth and efficient flow of data during the ETL process.

The Data Warehouse shall serve as the central analytical repository for consolidated and validated data. It will be used by relevant departments for formal reporting, monitoring, and ad-hoc analytical queries.

Strategic, statistical, and policy-related reports shall be generated from the Data Warehouse to ensure consistency, harmonization, and data integrity. Operational or transactional reports required for day-to-day system use may continue to be generated from the respective IAIP modules where appropriate.

Business Intelligence (BI) software will be used to source, sort, consolidate, analyze, and present complex data into digestible reports for insights. BI encompasses a wide variety of tools, applications and methodologies that enable users to collect data from internal systems and external sources, prepare it for analysis, develop and run queries against that data, and create reports, dashboards and data visualizations to make the analytical results available to decision-makers, as well as operational workers. BI will enable users to generate simple aggregate tables, charts and graphs from data typically stored in a data warehouse. Data from data warehouse can be organized in smaller data marts that hold subsets of information. The users of BI can select dimensions and measures they want to analyze, implement some filtering and generate appropriate tables/charts in a second, without waiting for someone else to prepare data and present them.

BI software is also designed to use data that is stored in any type of data warehouse or storage system. The BI software allows management to better see the relationship between different data for better decision-making and distribution of resources. It is a suite of software and services to transform data into actionable intelligence and knowledge.

**Data Warehouse Detailed Requirements**

Number	Feature	Type
<b>BIP.03.01</b>	The Data Warehouse must accept and manage data from internal and external systems and be able to extract, transform and load (ETL) data such that it can be used to serve the decision-makers	<b>M</b>
<b>BIP.03.02</b>	The Data Warehouse must fully support the generation of management reports through integrated BI tools.	<b>M</b>
<b>BIP.03.03</b>	The Data Warehouse must be optimized for analytical workloads and large datasets, using appropriate storage, indexing, and data organization mechanisms (e.g. columnar storage or equivalent analytical optimization techniques) to ensure efficient query performance.	<b>M</b>
<b>BIP.03.04</b>	The Data Warehouse must have the ability to scale resources horizontally to handle increased data volumes and user concurrency.	<b>M</b>
<b>BIP.03.05</b>	The Data Warehouse must have the ability for optimizing query performance through features such as indexing, partitioning, and query parallelization.	<b>M</b>
<b>BIP.03.06</b>	The Data Warehouse must have a robust authentication mechanisms and role-based access control to secure data and manage user permissions.	<b>M</b>
<b>BIP.03.07</b>	The Data Warehouse must have support for star schema or snowflake schema data modeling to organize and structure data for efficient querying and reporting.	<b>M</b>
<b>BIP.03.08</b>	The solution shall support integration with advanced analytics and machine learning environments (e.g. R, Python or similar analytical	<b>M</b>

	tools), allowing the development, training, and execution of analytical models on data stored in the Data Warehouse.	
	The platform should support common analytical techniques such as regression, classification, clustering, time series analysis, and anomaly detection through integrated analytical tools or external analytical environments.	

### 2.6.2.3. Staging Databases

The staging database serves as a temporary and isolated environment where raw data is initially loaded before being transformed and moved into the Data Warehouse. It supports bulk loading of large datasets, ensures that data cleansing, validation, and deduplication are performed outside of the production warehouse, and provides detailed error logging for rejected records. The staging area must maintain full audit trails of all data movements and transformations to guarantee transparency and traceability. Data stored in the staging database is transient and must be retained only for a limited period necessary to complete the ETL process, after which it should be automatically purged to optimize performance and minimize risks.

#### Staging Databases Detailed Requirements

Number	Feature	Type
<b>BIP.04.01</b>	The staging database shell serves as a holding area for the raw data before it undergoes the transformation process.	<b>M</b>
<b>BIP.04.02</b>	The staging database shall allow for the separation of the extraction and loading phases, providing flexibility and control over the data before it enters the data warehouse.	<b>M</b>
<b>BIP.04.03</b>	Once the data is in the staging database, it undergoes transformation processes.	<b>M</b>
<b>BIP.04.04</b>	Transformations shall include data cleansing, validation, normalization, and aggregation to ensure that the data is in the appropriate format and structure for analysis.	<b>M</b>
<b>BIP.04.05</b>	Data quality checks and validation shall be done before the data is loaded into the main data warehouse. This helps identify and rectify any issues or discrepancies in the source data.	<b>M</b>
<b>BIP.04.06</b>	The staging databases shall facilitate incremental loading, where only new or changed data is processed and loaded into the data warehouse. This can improve efficiency and reduce the load on both source systems and the data warehouse.	<b>M</b>
<b>BIP.04.07</b>	The staging databases shall have a more flexible and temporary schema compared to the data warehouse, allowing for quick ingestion of diverse data types and structures. This flexibility should accommodate the variety of data formats encountered in different source systems.	<b>M</b>
<b>BIP.04.08</b>	The staging database shall optimize performance during the ETL process, such as parallel processing, indexing, and other optimizations that may not be feasible or efficient directly on the main data warehouse tables.	<b>M</b>

<b>BIP.04.09</b>	Data analysts and data engineers shall be able to use the staging area to profile and explore the data before it is loaded into the data warehouse.	<b>M</b>
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#### 2.6.2.4. Data Modeling

Data modeling within the IAIP and BI platform will represent the process of defining, organizing, and structuring data requirements to ensure consistency and efficiency across all agricultural registries and analytical processes. It will provide abstract representations of data entities, attributes, and their relationships, forming the foundation for both the operational database (OLTP) and the analytical environment (data warehouse and data marts).

Through standardized data modeling, the IAIP will guarantee harmonization of registries, facilitate integration and interoperability with external systems, and support interoperability in line with EU and INSPIRE requirements. Properly designed data models will ensure that data is stored efficiently, queried effectively, and managed securely, while enabling advanced analysis, monitoring, and evaluation through the BI platform.

#### Data Modeling Detailed Requirements

Number	Feature	Type
<b>BIP.05.01</b>	The system shall enable the following <u>BI Platform functions</u> : Interactive visualization, User-friendliness, Platform customization.	<b>M</b>
<b>BIP.05.02</b>	The system shall enable the following BI Data Visualization functions: <ul style="list-style-type: none"> <li>- Storyboarding,</li> <li>- Dashboards,</li> <li>- Geospatial Integration,</li> <li>- Tables,</li> <li>- Charts and graphs,</li> <li>- Infographics, Filters,</li> <li>- Sorting graph elements,</li> <li>- Widgets,</li> <li>- Drag and Drop Customization,</li> <li>- Templates,</li> <li>- Freehand SQL Command,</li> <li>- Layouts,</li> <li>- Themes.</li> </ul>	<b>M</b>
<b>BIP.05.03</b>	The system shall enable the following Analytics features: <ul style="list-style-type: none"> <li>- Benchmarking,</li> <li>- Predictive analytics,</li> <li>- What-If analysis,</li> <li>- Ad-hoc analysis,</li> <li>- Trend indicators,</li> <li>- In-Memory analysis,</li> <li>- Statistic analytics,</li> <li>- Data Mining,</li> </ul>	<b>M</b>

	- Machine Learning.	
<b>BIP.05.04</b>	The system shall enable the following Online Analytical Processing (OLAP) features: <ul style="list-style-type: none"> <li>- Multi-dimensional analysis and Pivot Tables with meta data layer (that allows users and report writers to see and access information in simple business language),</li> <li>- Moving averages and regression to highlight trends in data,</li> <li>- Drill-Down, Data Exploration, and Time-series (Auto) generation.</li> </ul>	<b>M</b>
<b>BIP.05.05</b>	The solution shall have the ability to establish relationships between tables which shall connect data from different tables, facilitating the creation of unified reports and analyses	<b>M</b>
<b>BIP.05.06</b>	The solution shall support Data Analysis Expressions for creating custom calculations and aggregations.	<b>M</b>
<b>BIP.05.07</b>	The solution must have the ability to create hierarchies to organize data into structured levels for drill-down and navigation.	<b>M</b>
<b>BIP.05.08</b>	The solution shall have the ability to view the data model where visual inspection can be done on relationships, tables, and fields within the data model.	<b>M</b>
<b>BIP.05.09</b>	The system shall enable exporting reports into the standard document formats like: MS Excel, PDF, HTML.	<b>M</b>
<b>BIP.05.10</b>	The system shall enable generation of interactive reports through “dynamic query mechanisms”.	<b>M</b>
<b>BIP.05.11</b>	The system must be implemented on a standard industry platform based on a modern service-based architecture, supporting standard APIs and enabling future functional and technological extensions and upgrades.	<b>M</b>
<b>BIP.05.12</b>	The system must be able to create various maps and graphs, based on the execution of queries over the data.	<b>M</b>
<b>BIP.05.13</b>	The Supplier shall conduct requirements refinement workshops with MAFWE units during the inception phase to confirm detailed functional specifications for data modeling and BI tools.	<b>M</b>

### 2.6.3. BI Analytical Framework and Policy Use Cases

The BI platform is intended to support evidence-based decision-making within MAFWE by enabling integrated analysis of data originating from IAIP registries, monitoring systems, and external statistical sources.

While the technical capabilities of the BI platform include advanced analytical features such as predictive analytics, scenario analysis, benchmarking, and data mining, the practical usefulness of these capabilities depends on their alignment with concrete policy and monitoring needs.

To ensure that the BI platform effectively supports policy analysis and sector monitoring, the analytical framework of the BI environment shall be defined in close cooperation with MAFWE during the system inception phase.

### **2.6.3.1. Identification of Priority Policy Questions**

During the inception phase, the Supplier shall facilitate analytical workshops with relevant MAFWE departments in order to identify a prioritized list of key analytical and policy questions that the BI platform should support.

These questions shall reflect the core analytical needs related to:

- Agricultural policy monitoring;
- Rural development measures;
- Farm performance and structural change;
- Monitoring of public support measures;
- Sector performance and productivity trends.

The analytical framework shall include a minimum set of prioritized policy use cases to ensure meaningful analytical coverage.

At least 10–15 key policy questions shall be identified and elaborated during the inception phase.

Based on these consultations, a prioritized list of analytical use cases shall be prepared, identifying for each use case:

- The relevant policy question;
- The datasets required for analysis;
- The analytical approach to be applied;
- The expected analytical outputs (dashboards, indicators, reports).

The purpose of this exercise is to ensure that the BI platform supports practical analytical workflows and policy evaluation needs.

### **2.6.3.2. FADN Analytical Methodology**

The BI platform will support analytical functions related to Farm Accountancy Data Network (FADN) datasets and related economic indicators.

Given the methodological complexity associated with FADN-based analysis, including sampling structures and econometric evaluation approaches, the analytical methodology implemented in the BI platform shall be developed in consultation with relevant domain experts within MAFWE and other competent institutions where appropriate.

The development and validation of the FADN analytical methodology should also include consultation with a qualified external expert in agricultural economics, policy analysis or statistical evaluation where necessary, provided by the Supplier.

Such expert involvement shall ensure methodological soundness and alignment with recognized analytical standards and practices.

The role of the Supplier shall be to implement analytical tools and data processing mechanisms consistent with the agreed methodological framework.

### **2.6.3.3. Integration of State Statistical Office Data**

Data published by the State Statistical Office (SSO) represent an important contextual source for agricultural sector analysis.

Where feasible and permitted, relevant SSO datasets may be incorporated into the IAIP analytical environment through appropriate automated data retrieval or structured data import mechanisms.

Where feasible and permitted, data ingestion shall be considered the preferred approach for enabling advanced analytical functionality, including cross-tabulation, aggregation, and drill-down analysis.

Where direct data ingestion is not feasible, the BI platform may provide structured references or links to official statistical datasets published through the SSO MakStat portal.

Where only link-based integration is possible, the Supplier shall clearly document the resulting analytical limitations and ensure that such limitations are understood and reflected in the design of analytical outputs and dashboards.

The chosen approach shall ensure that users of the BI platform clearly understand the availability and analytical limitations of externally referenced datasets.

#### **2.6.3.4. BI Analytical Workshops**

The BI platform implementation shall include analytical workshops during the inception phase to align the technical analytical capabilities of the platform with the policy and monitoring needs of MAFWE.

These workshops shall support:

- Identification of priority analytical use cases;
- Validation of key datasets and indicators;
- Definition of analytical dashboards and reporting outputs.

This process will ensure that the BI platform supports both advanced analytical capabilities and practical policy analysis needs.

The outputs of these workshops shall be formalized through the “BI Analytical Workshops Report” as defined in Chapter 2.10.1.

#### **2.6.4. BI Platform Customization**

The Supplier must deliver the BI Platform solution on a turnkey basis to meet all the functional, technical, and performance requirements included in this document. The Supplier’s scope of work is summarized below:

- BI inception and planning
- Preparation of detailed BI software requirements specifications
- Establishment of development, testing, and production environments
- Configuration, customization, and development of BI software modules
- Development of data exchange interfaces with the IAIP and other relevant systems
- Installation and configuration of the BI data warehouse, staging environment, and business intelligence tools
- Development of the BI web portal
- Integration of BI modules, interfaces, DW/BI tools, and the web portal
- Comprehensive BI platform testing (including UAT, load, stress, and performance testing)
- Operational acceptance of the BI Platform
- BI Platform training workshops, including orientation training, technical training, and workshops for change management
- BI Platform roll-out and go-live with all modules

- Warranty, maintenance, and support services

BI implementation shall be aligned with the overall IAIP rollout to ensure availability and validation of source datasets. The Supplier shall propose a phased BI delivery plan synchronized with the readiness of IAIP modules and external data interfaces.

## **2.7. Data Variables/Time Series to be included in the IAIP**

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### **2.7.1. Specification of data reports for direct payments**

General requirements for the data reports on direct payments measures and sub-measures:

- There will be 2 alternatives of data reports covering aggregates for regions and municipalities provided:
  - assignment of the area to respective regions or municipalities will be based on the location of the respective applicant.
  - assignment of the area to respective regions or municipalities will be based on the location of parcels of the respective applicant (different parcels of one applicant can be located in different regions or municipalities, which can also differ from the location of the applicant)
- The supplied set of data reports for sub-measures 1.1-1.20 and 2.1.-2.20 cover data report requirements for year 2023, but for other years (starting from 2012) data reports specification may differ and the supplier of IAIP shall adjust the specified data reports for time series and differences between sub-measures implemented in different years (e.g. green manure or fallow in crop rotation 10% of declared area, measure for meadows both introduced only in year 2024), and suggest solutions on how to compare results of same sub-measures or data reports between years.
- MAFWE may require from IAIP supplier to implement some data reports as OLAP cubes.
- In all data reports (including data reports for individual sub-measures, by age interval, region/municipality/gender, legal status and other) where it is relevant, the values will be included also for additional payments for organic production, e.g. adjusted data report for sub-measure 1.1 will be defined as a list of crops supported in measure 1.1 with values for each crop: applicant count for crops supported in measure 1.1, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied and amounts paid, applicant count for crops in organic production, male applicants count in organic production, female applicants count in organic production, hectares applied in organic production, hectares paid in organic production, amounts applied in organic production and amounts paid in organic production, amounts paid in organic production to male applicant, amounts paid in organic production to female applicant
- MAFWE will specify the currency (denars, EUR or both) in which the financial amounts should be displayed.
- MAFWE may decide to supplement all values with suffix “paid” with the values with suffix “approved”. MAFWE may decide to include both types of values in all data reports

#### **2.7.1.1. Link to M&E indicators:**

Specified data reports for direct payments will cover following M&E indicators, for which values on a yearly basis will be included in the separate data report (if the indicator is not

covered by the specified data reports, the MAFWE will provide the additional specification to the supplier, to find appropriate data source for the not covered indicator):

- I-O1- Number of units (ha/heads) and beneficiaries of basic payments distinguished by decoupled and coupled (PMEF)
- I-O2 - Number of units (ha/heads/kg/l of milk) and beneficiaries of additional direct payments according to the type (PMEF)
- I-O3 - Number of ha/beneficiaries benefiting from direct payments for supporting variable input elements in agriculture production – domestic inputs by type divided by crop (all crops except of tobacco)
- I-O4 - Number of beneficiaries receiving basic direct payments for small individual holdings
- II-O1 - Number of ha/heads/beneficiaries covered by climate change commitments going beyond mandatory requirements (PMEF) – organic production
- II-O2 - Number of ha benefiting from support for areas facing natural or other specific constraints broken per type of the area (PMEF)
- I-R2 - Share of farms with supported risk managements tools (strategy monitoring ) (PMEF)
- I-R5 - Share of farmers benefiting from support for improving quality (strategy monitoring) (only the nominator, partially covered)
- II-R9 - Share of UAA with supported organic farming (strategy monitoring) (PMEF) – Strategy indicator (Table 6)

#### **2.7.1.2. List of data sources for the specified data reports:**

Data reports on direct payments will be based on data from following data resources followed by the institution, where the data source is implemented:

- IACS/ISAC provided by AFSARD
- LPIS provide by MAFWE (LPIS will become part of IAIP, and the reports will extract data directly from the IAIP).
- ISET provided by MAFWE (ISET will also be integrated as part of IAIP, and the reports will extract data directly from the IAIP).
- Register of buyers provided by MAFWE (this register is planned to be included in IAIP; once integrated, the reports will extract the data from the IAIP).

#### **2.7.1.3. Data reports on direct payments - crop sub-measures**

- List of sub-measures 1.1-1.20 (year of the sub-measure, code of the sub-measure, abbreviated name of the sub-measure, unit of measurement for support – hectares, kg, pieces) for all regions and for each region with values for each sub-measure: applicant count, male applicants count, female applicants count, units applied, units paid, amounts applied and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- List of crops supported in measure 1.1 with values for each crop: applicant count for crops supported in measure 1.1, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.

- For intervals of area applied for sub-measure 1.1 between 0,5 ha to 50 ha, from 50 ha to 100 ha and over 100 ha in different years values: applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- List of crops supported in sub-measure 1.2 with values for each crop and for sub-measure 1.1. and sub-measure 1.2: applicant count (sub-measure 1.1. and sub-measure 1.2), male applicants count (sub-measure 1.1. and sub-measure 1.2), female applicants count (sub-measure 1.1. and sub-measure 1.2), hectares applied (sub-measure 1.1. and sub-measure 1.2), hectares paid (sub-measure 1.1. and sub-measure 1.2), amounts applied (sub-measure 1.1. and sub-measure 1.2) and amounts paid (sub-measure 1.1. and sub-measure 1.2), amounts paid to male applicants, amounts paid to female applicants.
- For intervals of area applied for sub-measure 1.2 between 0,5 ha to 50 ha, from 50 ha to 100 ha and over 100 ha in different years values: applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- List of crops supported in sub-measure 1.3 (**realized production of wheat, barley, sunflower, oilseed beet and poppy**) with values for each crop and for sub-measure 1.1. and sub-measure 1.3: applicant count (sub-measure 1.1. and sub-measure 1.3), male applicants count (sub-measure 1.1. and sub-measure 1.3), female applicants count (sub-measure 1.1. and sub-measure 1.3), hectares applied (sub-measure 1.1. and sub-measure 1.3), hectares paid (sub-measure 1.1. and sub-measure 1.3), amounts applied (sub-measure 1.1. and sub-measure 1.3) and amounts paid (sub-measure 1.1. and sub-measure 1.3), amounts paid to male applicants, amounts paid to female applicants, kilograms of harvested crops purchased by registered buyers (from buyers register linked to this report through applicant), amount paid for harvested crops purchased by registered buyers
- For intervals of area applied for sub-measure 1.3 (**realized production of wheat, barley, sunflower, oilseed beet and poppy**) between 0,5 ha to 50 ha, from 50 ha to 100 ha and over 100 ha in different years values: applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied and amounts paid, amounts paid to male applicants, amounts paid to female applicants, kilograms of harvested crops purchased by registered buyers (from buyers register linked to this report through applicant), amount paid for harvested crops purchased by registered buyers.
- List of crops supported in measure 1.4 (**horticultural production and flowers outdoors and in greenhouses**) with values for each crop: applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- List of crops supported in sub-measure 1.5 (**additional payment for tomato, pepper, cucumber, gherkin, cabbage, beans and potatoes in the open and in greenhouses**) with values for each crop and for sub-measure 1.4 and sub-measure 1.5: applicant count (sub-measure 1.4 and sub-measure 1.5), male applicants count (sub-measure 1.4 and sub-measure 1.5), female applicants count (sub-measure 1.4 and sub-measure 1.5), hectares applied (sub-measure 1.4 and sub-measure 1.5), hectares paid (sub-measure 1.4

and sub-measure 1.5), amounts applied (sub-measure 1.4 and sub-measure 1.5) and amounts paid (sub-measure 1.4 and sub-measure 1.5) , amounts paid to male applicants, amounts paid to female applicants, kilograms of harvested crops purchased by registered buyers (from buyers register linked to this report through applicant), amount paid for harvested crops purchased by registered buyers.

- List of crops supported in sub-measure 1.6 (**Additional direct payments for production under controlled conditions of tomatoes, peppers and cucumber**) with values for each crop and for sub-measure 1.4 and sub-measure 1.6: applicant count (sub-measure 1.4 and sub-measure 1.6), male applicants count (sub-measure 1.4 and sub-measure 1.6), female applicants count (sub-measure 1.4 and sub-measure 1.6), hectares applied (sub-measure 1.4 and sub-measure 1.6), hectares paid (sub-measure 1.4 and sub-measure 1.6), amounts applied (sub-measure 1.4 and sub-measure 1.6) and amounts paid (sub-measure 1.4 and sub-measure 1.6), amounts paid to male applicants, amounts paid to female applicants.
- List of crops supported in sub-measure 1.7 (**Additional direct payments for vegetable crops delivered to processing facilities**) with values for each crop and for sub-measure 1.4 and sub-measure 1.7: applicant count (sub-measure 1.4 and sub-measure 1.7), male applicants count (sub-measure 1.4 and sub-measure 1.7), female applicants count (sub-measure 1.4 and sub-measure 1.7), hectares applied (sub-measure 1.4 and sub-measure 1.7), hectares paid (sub-measure 1.4 and sub-measure 1.7), amounts applied (sub-measure 1.4 and sub-measure 1.7) and amounts paid (sub-measure 1.4 and sub-measure 1.7), amounts paid to male applicants, amounts paid to female applicants, kilograms of vegetables purchased by registered buyers (from buyers register linked to this report through applicant), amount paid for vegetables purchased by registered buyers.
- List of crops supported in measure **1.8 (Maintenance of orchards)** with values for each crop: applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- For intervals of area applied for sub-measure **1.8 (Maintenance of orchards)** between 0,2 ha to 5 ha, from 5,1 ha to 30 ha and over 30 ha in different years values: applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- List of crops supported in sub-measure **1.9 (realized fruit production)** with values for each crop and for sub-measure 1.8 and sub-measure 1.9: applicant count (sub-measure 1.8 and sub-measure 1.9), male applicants count (sub-measure 1.8 and sub-measure 1.9), female applicants count (sub-measure 1.8 and sub-measure 1.9), hectares applied (sub-measure 1.8 and sub-measure 1.9), hectares paid (sub-measure 1.8 and sub-measure 1.9), amounts applied (sub-measure 1.8 and sub-measure 1.9) and amounts paid (sub-measure 1.8 and sub-measure 1.9), amounts paid to male applicants, amounts paid to female applicants, kilograms of fruits purchased by registered buyers (from buyers register linked to this report through applicant), amount paid for fruits purchased by registered buyers.
- For intervals of area applied for sub-measure **1.9 (realized fruit production)** between 0,2 ha to 5 ha, from 5,1 ha to 30 ha and over 30 ha in different years values: applicant count, male applicants count, female applicants count, hectares applied, hectares paid,

amounts applied and amounts paid, amounts paid to male applicants, amounts paid to female applicants, kilograms of fruits purchased by registered buyers (from buyers register linked to this report through applicant), amount paid for fruits purchased by registered buyers.

- List of crops supported in sub-measure **1.10 (fruits delivered for processing)** with values for each crop and for sub-measure 1.8 and sub-measure 1.10: applicant count (sub-measure 1.8 and sub-measure 1.10), male applicants count (sub-measure 1.8 and sub-measure 1.10), female applicants count (sub-measure 1.8 and sub-measure 1.10), kilograms of fruit applied (sub-measure 1.8 and sub-measure 1.10), kilograms of fruit paid (sub-measure 1.8 and sub-measure 1.10), amounts applied (sub-measure 1.8 and sub-measure 1.10) and amounts paid (sub-measure 1.8 and sub-measure 1.10), amounts paid to male applicants, amounts paid to female applicants, kilograms of fruits purchased by registered buyers (from buyers register linked to this report through applicant), amount paid for fruits purchased by registered buyers.
- List of crops supported in sub-measure **1.11 (Apples delivered for processing)** with values for each crop and for sub-measure 1.8 and sub-measure 1.11: applicant count (sub-measure 1.8 and sub-measure 1.11), male applicants count (sub-measure 1.8 and sub-measure 1.11), female applicants count (sub-measure 1.8 and sub-measure 1.11), kilograms of apples applied (sub-measure 1.8 and sub-measure 1.11), kilograms of apples paid (sub-measure 1.8 and sub-measure 1.11), amounts applied (sub-measure 1.8 and sub-measure 1.11) and amounts paid (sub-measure 1.8 and sub-measure 1.11), amounts paid to male applicants, amounts paid to female applicants, kilograms of apples purchased by registered buyers (from buyers register linked to this report through applicant), amount paid for apples purchased by registered buyers.
- For intervals of area applied for sub-measure **1.12 (Maintenance of existing vineyards)** between 0,2 ha to 10 ha, from 10 ha to 30 ha and over 30 ha and total in different years values: applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- List of crops supported in sub-measure **1.13 (Realized grape production)** with values for each crop and for sub-measure 1.12 and sub-measure 1.13: applicant count (sub-measure 1.12 and sub-measure 1.13), male applicants count (sub-measure 1.12 and sub-measure 1.13), female applicants count (sub-measure 1.12 and sub-measure 1.13), hectares applied (sub-measure 1.12 and sub-measure 1.13), hectares paid (sub-measure 1.12 and sub-measure 1.13), amounts applied (sub-measure 1.12 and sub-measure 1.13) and amounts paid (sub-measure 1.12 and sub-measure 1.13), amounts paid to male applicants, amounts paid to female applicants, kilograms of grape purchased by registered buyers (from buyers register linked to this report through applicant), amount paid for grape purchased by registered buyers.
- For intervals of area applied for sub-measure **1.13 (Realized grape production)** between 0,2 ha to 10 ha, from 10 ha to 30 ha and over 30 ha and total in different years values: applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied and amounts paid, amounts paid to male applicants, amounts paid to female applicants, kilograms of grape purchased by registered buyers (from buyers register linked to this report through applicant), amount paid for grape purchased by registered buyers.

- For different classes of tobacco and varieties of tobacco supported in sub-measure **1.14 (Contracted and Sold Tobacco)** values for each tobacco class and variety: applicant count, male applicants count, female applicants count, kilograms of tobacco applied, kilograms of tobacco paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants, kilograms of tobacco purchased by registered buyers (from ISET register linked to this report through classes of tobacco and varieties of tobacco), amount paid for tobacco purchased by registered buyers.
- For different crops and their generations of seed material (C1 and C2) supported in sub-measure **1.15 (Certified seed material)** values for each crop and generation: applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- For different crops and their generation categories of planting material (SAS, higher generations) supported in sub-measure **1.16 (Certified vine and fruit planting material)** values for each crop and generation category: applicant count, male applicants count, female applicants count, seedlings applied, seedlings paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- For different crops supported in sub-measure **1.17 (Certified horticulture and flower planting material)** values for each crop: applicant count, male applicants count, female applicants count, young plants applied, young plants paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- For different crops supported in sub-measure **1.18 (Production of flowers in vitro and in pots)** values for each crop and type of young plant (in vitro, in pot): applicant count, male applicants count, female applicants count, young plants applied, young plants paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- For different crops and their generations of seed material (basic, pre-basic) supported in sub-measure **1.19 (Basic seed material)** values for each crop and generation: applicant count, male applicants count, female applicants count, kilograms applied, kilograms paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- For intervals of approved average support in agriculture in years 2020, 2021, 2022 supported in sub-measure **1.20 (Historical payments for small farmers)** between 0 to 10.000 denars, from 10.001 to 20.000 denars, from 20.001 to 30.000 denars, from 30.001 to 40.000 denars values: applicant count, male applicants count, female applicants count, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- List of crops and for each crop aggregated values for all sub-measures 1.1.-1.20: applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied, amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- List of crops and for each crop aggregated values: irrigated hectares applied, total hectares applied: irrigated hectares paid, total hectares paid, share of irrigated hectares paid to total hectares paid in %

#### 2.7.1.4. Data reports on direct payments - animal sub-measures

- List of sub-measures 2.1-2.20 (year of the sub-measure, code of the sub-measure, abbreviated name of the sub-measure, measurement unit for measure support – head, liters of milk, costs) for all regions and for each region with values for each sub-measure: applicant count, male applicants count, female applicants count, units applied, units paid, amounts applied, and amounts paid, amounts paid to male applicant, amounts paid to female applicant (there is no need for the separate data report for sub-measures 2.1., 2.2., 2.3, 2.5, 2.6, 2.8., 2.9, 2.10, 2.11, 2.12, 2.13, 2.15, 2.16, 2.17, 2.19, 2.20, since they are all covered by this data report).
- For each type of milk (cow’s milk, sheep’s milk, goat’s milk) supported in sub-measure **2.4. (Produced and delivered milk)** values: applicant count, male applicants count, female applicants count, liters of milk applied, liters of milk paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants, liters of milk purchased by registered buyers (from buyers register linked to this report through type of milk), amount paid for milk purchased by registered buyers.
- For each type of insemination (in-vitro, sexed semen) supported in sub-measure **2.7. (Cattle insemination)** values: applicant count, male applicants count, female applicants count, heads applied, heads paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- For intervals of heads count applied for sub-measure **2.14 (Fattening of fatlings)** between from 5 to 5000 heads, from 5001 to 15000 heads and over 15001 heads in different years values: applicant count, male applicants count, female applicants count, heads applied, heads paid, amounts applied, and amounts paid, amounts paid to male applicant, amounts paid to female applicant
- For each interval of number of registered bee families (between 10 and 50 bee families, above 50 bee families) supported in sub-measure **2.18 (Registered hibernated bee families)** values: applicant count, male applicants count, female applicants count, count of bee families applied, count of bee families paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- List of animal species and for each animal species aggregated values for all sub-measures 2.1.-2.20: applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied, amounts paid, amounts paid to male applicants, amounts paid to female applicants.

#### 2.7.1.5. Data reports on age structure of applicants for direct payments

- list of sub-measures 1.1-1.20 and 2.1.-2.20 in rows with count of applied applicants divided in age intervals in columns: below 18, 18-25,25-30,30-35,35-40, 40-45, 45-50, 50-55, 55-60, 60-65, above 65, in separate column total below 40 years and total.
- list of sub-measures 1.1-1.20 and 2.1.-2.20 in rows with count of applied male applicants divided in age intervals in columns: below 18, 18-25,25-30,30-35,35-40, 40-45, 45-50, 50-55, 55-60, 60-65, above 65, in separate column total below 40 years and total.
- list of sub-measures 1.1-1.20 and 2.1.-2.20 in rows with count of applied female applicants divided in age intervals in columns: below 18, 18-25,25-30,30-35,35-40, 40-45, 45-50, 50-55, 55-60, 60-65, above 65, in separate column total below 40 years and total.

- list of sub-measures 1.1-1.20 and 2.1.-2.20 in rows with amount applied divided in age intervals in columns: below 18, 18-25,25-30,30-35,35-40, 40-45, 45-50, 50-55, 55-60, 60-65, above 65, in separate column total below 40 years and total.
- list of sub-measures 1.1-1.20 and 2.1.-2.20 in rows with amount paid divided in age intervals in columns: below 18, 18-25,25-30,30-35,35-40, 40-45, 45-50, 50-55, 55-60, 60-65, above 65, in separate column total below 40 years and total.
- list of sub-measures 1.1-1.20 and 2.1.-2.20 in rows with amount paid to male applicants divided in age intervals in columns: below 18, 18-25,25-30,30-35,35-40, 40-45, 45-50, 50-55, 55-60, 60-65, above 65, in separate column total below 40 years and total.
- list of sub-measures 1.1-1.20 and 2.1.-2.20 in rows with amount paid to female applicants divided in age intervals in columns: below 18, 18-25,25-30,30-35,35-40, 40-45, 45-50, 50-55, 55-60, 60-65, above 65, in separate column total below 40 years and total

#### **2.7.1.6. Data reports on location of applicants for direct payments**

- List of regions with values aggregated for all sub-measures 1.1.-1.20 and 2.1.-2.20: applicant counts, hectares applied, hectares paid, animals applied, animals paid
- List of municipalities with values aggregated for all sub-measures 1.1.-1.20 and 2.1.-2.20: applicant counts, hectares applied, hectares paid, animals applied, animals paid
- List of sub-measures 1.1.-1.20 and 2.1.-2.20 with applicant's counts (total/males/females) for each region.
- List of regions and for each region aggregated values: irrigated hectares applied, total hectares applied, irrigated hectares paid, total hectares paid, share of irrigated hectares paid to total hectares paid in %
- List of municipalities and for each municipality aggregated values: irrigated hectares applied, irrigated hectares paid, total hectares paid, share of irrigated hectares paid to total hectares paid in %

#### **2.7.1.7. Data reports for additional direct payment measures**

- Reports for maternity leave containing count of women, count of born children, count of women registered as holder of agricultural holding, count of women registered as the member of the agricultural holding household, total amount paid, amount paid per women separately by region, by municipality, by age intervals.
- List of municipalities and for each municipality, values for farmers who receive additional payment for areas with natural constraints (ANC): applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- List of regions and for each region, values for farmers who receive additional payment for areas with natural constraints (ANC): applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
- Report on green fuel measure: List of grouping of crops and for each grouping values for: applicant count, male applicants count, female applicants count, hectares applied, hectares

paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.

- Reports on market intervention
  - List of crops supported through market intervention and for each crop, values for: applicant count, male applicants count, female applicants count, hectares applied, hectares paid, kilograms applied, kilograms paid, amounts applied and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
  - For the school scheme (weekly update of the relevant data from AFSARD) list of fruits (e.g. apples, cherries, peaches, plums, etc.) and for each fruit, farmer count, male farmer count, female farmer count, kilograms bought, amounts paid, amounts paid to male farmers, amounts paid to female farmers, weighted price per kilogram, kilograms delivered to kinder garden.
- Reports on autochthonous breeds and varieties
  - List of animal species (cattle, sheep, goats, sheepdogs, buffaloes) and autochthonous breeds with values for applicant count, male applicants count, female applicants count, animal heads applied, animal heads paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.
  - List of crops and respective autochthonous plant varieties with values for applicant count, male applicants count, female applicants count, hectares applied, hectares paid, amounts applied, and amounts paid, amounts paid to male applicants, amounts paid to female applicants.

### **2.7.2. Specification of data reports for RD, IPARD Fisheries and Aquaculture programs**

General requirements for the data reports:

- MAFWE will decide about the order of displayed data report attributes.
- All monetary amounts are stated in denars.
- MAFWE will decide which additional data reports will be provided separately or combined with general data reports.
- The primary data source for the specified data reports will be the information system for administration of RD, IPARD, Fisheries and Aquaculture programs applications and payments implemented by AFSARD.
- MAFWE may require from IAIP supplier to implement some data reports as OLAP cubes.

Subsequently, general reports will be available for each of the 3 programs: RD, IPARD, Fisheries and Aquaculture:

- General summary data report 1.
- General summary data report 2.
- General detailed data report.

#### **2.7.2.1. Link to M&E indicators**

Specified data reports will cover the following M&E indicators, for which values on a yearly basis will be included. If an indicator is not covered by the specified data reports, MAFWE will provide the additional specification to the IAIP supplier, in order to find appropriate data source for the not covered indicator:

- I-O5 - Number of operations/beneficiaries receiving on farm productive investment support (PMEF).
- I-O6 - Number of tractors purchased.
- I-O7 - Number of beneficiaries of support changing the varietal structure in viticulture and fruit growing.
- I-O8 - No of hectares supported for changing the varietal structure in viticulture and fruit growing.
- I-O9 - No of beneficiaries of support for improving genetic potential and protection of varieties on family farms.
- I-O10 - Number of heads supported for improving genetic potential and protection of varieties on family farms.
- I-O11 - Number of operations/beneficiaries receiving investment support for infrastructure (PMEF).
- I-O12 - Number of economic associations of agriculture holdings supported for joint performance of agriculture activity.
- I-O13 - Number of members of economic associations of agriculture holdings supported for joint performance of agriculture activity (in total and per association).
- I-O14 - Number of supported producer organizations (PMEF).
- I-O15 - Number of supported cooperation operations or units (PMEF).
- I-O16 - Number of projects implemented by producer organizations (PMEF).
- II-O1 - Number of ha/heads/beneficiaries covered by climate change commitments going beyond mandatory requirements (PMEF).
- II-O3 - Number of ha supported for carrying out agriculture activity in accordance to GAP principles.
- II-O4 - Number of livestock units (LU) benefitting from support for animal welfare, health, or increased biosecurity measures (PMEF).
- II-O5 - Number of ha with preserved traditional fabric of countryside.
- II-O6 - Number of ha/heads/beneficiaries supported for preservation genetic diversity of indigenous agriculture plants and livestock breeds.
- III-O1 - Number of young farmers supported for setting up the farms (PMEF).
- III-O2 - Number of supported beneficiaries for generational renewal (PMEF).
- III-O3 - Number of young farmers supported for farm modernization.
- III-O4 - Number of supported active female farmers/ female members of agriculture holding.
- III-O5 - Number of supported micro and small start-ups/enterprises.
- III-O6 - Km of roads, pedestrians, water and sewage pipes supported.
- III-O7 - Number of beneficiaries supported for reconstruction and development of villages.
- III-O8 - Number of beneficiaries supported for promotion of traditional values in rural areas.
- III-O9 - Number of preparatory actions to establish LAGs and develop LDS (PMEF).
- III-10 - Number of supported local action groups (LAG)/local development strategies (LDS) (PMEF).
- III-11 - Population covered by LAGs.
- III-12 - Number of projects implemented through local development strategies in LAG territories.

- I-R4 - Share of farms receiving investment support to modernize (strategy monitoring) (PMEF) (only the nominator part of the indicator covered).
- I-R5 - Share of farmers benefiting from support for improving quality (strategy monitoring) (only the nominator of the indicator partially covered).
- I-R6 - Number of persons benefitting from advice, training, knowledge exchange (strategy monitoring) (PMEF).
- I-R7 Share of farms receiving investment support to restructure.
- I-R8 - Share of farms participating in producer organizations, local markets, short supply chain circuits and quality schemes (by type of farms) (strategy monitoring) (PMEF).
- I-R9 - Number of agriculture cooperatives and average no of members (MAFWE) – Strategy indicator (Table 6).
- II-R1 - Share of crop/animal varieties appropriate to the future climate regime of total no of varieties grown by type of crop (strategy monitoring).
- II-R2 - Share of supported irrigated land of total arable land, in % (only the nominator part of the indicator).
- II-R3 - Share of UAA with modernized/expanded water management and drainage system (strategy monitoring).
- II-R4 - Supported investments in renewable energy production capacity, including bio-based in MW (strategy monitoring) (PMEF).
- II-R5 - Share of UAA under supported commitments to improve water balance (strategy monitoring) (PMEF) (only the nominator of the indicator covered).
- II-R6 - Share of UAA under supported commitments beneficial for soil management to improve soil quality and biota (strategy monitoring) (PMEF).
- II-R7 - Number of persons benefitting from advice, training, knowledge exchange related to environmental or climate-related performance (strategy monitoring) (PMEF).
- II-R8 Share of domestic varieties on total number of varieties grown (strategy monitoring).
- II-R10 - Share of UAA under supported commitments for supporting biodiversity conservation or restoration including high-nature-value farming practices (strategy monitoring) (PMEF).
- II-R11 - Share of UAA under supported commitments for managing landscape features (strategy monitoring).
- III-R1 - Number and share of young farmers benefitting from support including a gender breakdown (strategy monitoring) (PMEF).
- III-R2 - Number of young persons benefitting from advice, training, and knowledge exchange who are in or want to enter farming (strategy monitoring).
- III-R3 - Number and share of farmers supported with early retirement schemes (strategy monitoring).
- III-R4 - Number of jobs created in supported projects (strategy monitoring) (PMEF).
- III-R5 - Number of micro and small rural businesses, developed through support (strategy monitoring) (PMEF).
- III-R6 - Share of rural population benefitting from improved access to services and infrastructure through support (strategy monitoring) (PMEF).
- III-R7 Share of rural population covered by local development strategies (strategy monitoring) (PMEF).
- III-R8 - Number of women in farming and non-farming activities in supported projects.

- III-R9 - Share of livestock units (LU) covered by supported actions to limit the use of antimicrobials.
- III-R10 Share of livestock units (LU) covered by supported actions to improve animal welfare.
- III-R11 - No of promotion activities for healthy and sustainable diet.

#### **2.7.2.2. General summary data report 1**

The general summary data report 1 will contain option for filtering for regions and for interval of dates of application (application date from – application date to)

General summary report 1 shall contain list of sub-measures: code of the measure, title of the measure, code of the sub-measure, title of the sub-measure with values (data variables) for:

1. applicants count,
2. rejected applicants count,
3. operation count,
4. beneficiaries count,
5. Total project costs – applied,
6. Total project costs – rejected applications,
7. Total project costs – paid,
8. Amount to be paid by state budget – applied,
9. Amount to be paid by state budget – rejected applications,
10. Amount to be paid by state budget – paid,
11. Amount to be paid by beneficiary – applied,
12. Amount to be paid by beneficiary – rejected applications,
13. Amount to be paid by beneficiary – paid,
14. Total amount applied,
15. Total amount contracted,
16. Share of total amount contracted from total amount applied,
17. Total amount requested for payment,
18. Share of total amount requested for payment from total amount applied,
19. Total amount approved,
20. Share of total amount approved from total amount applied,
21. Total amount paid,
22. Share of total amount paid from total amount applied,
23. Count of final payments,
24. Amount of advanced payment,
25. Count of rejections caused by deficient documentation,
26. Count of rejections caused by non-fulfillment of criteria,
27. Count of rejections caused by other reason,
28. Female applicants count,
29. Male applicants count,
30. Female beneficiaries count,
31. Male beneficiaries count,
32. Total project costs - female applicants,
33. Total project costs - male applicants,
34. Amount paid by state budget to female applicants,
35. Amount paid by state budget to male applicants,

36. Amount paid per female beneficiary (total),
37. Amount paid per male beneficiary (total),
38. Young applicant count,
39. Young beneficiaries count,
40. Total project costs - young applicants,
41. Amount paid by state budget to young applicants,
42. Amount paid per young beneficiary (total)
43. Applicant count– micro firms,
44. Applicant count - small firms<sup>1</sup>,
45. Applicant count – medium firms,
46. Applicant count - large firms,
47. Applicant count – micro and small rural businesses,
48. Beneficiaries count – micro firms,
49. Beneficiaries count - small firms,
50. Beneficiaries count - medium firms,
51. Beneficiaries count - large firms,
52. Total project costs– micro firms,
53. Total project costs - small firms,
54. Total project costs - medium firms,
55. Total project costs - large firms,
56. Amount paid by state budget – micro firms,
57. Amount paid by state budget - small firms,
58. Amount paid by state budget – medium firms,
59. Amount paid by state budget - large firms,
60. Amount paid by beneficiary - micro firms,
61. Amount paid by beneficiary - small firms,
62. Amount paid by beneficiary - medium firms,
63. Amount paid by beneficiary - large firms,
64. Number of jobs created in supported operations (projects).

### **2.7.2.3. General summary data report 2**

The general summary data report 2 shall contain list of sub-measures including sub-measure title, budgetary item, measure code and for each sub-measure, values of:

1. programmed amount,
2. amount of obligations,
3. amount remaining from program,
4. amount paid from current amount,
5. amount paid amount from obligations,
6. amount remaining from obligations,
7. share of realization in % =  $[100 * (\text{amount paid from current amount} + \text{amount paid from obligations}) / \text{programmed amount}]$ .

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<sup>1</sup> [https://single-market-economy.ec.europa.eu/smes/sme-definition\\_en](https://single-market-economy.ec.europa.eu/smes/sme-definition_en)

General summary data report 2 shall contain (in the final row of the report) a summary row for the whole program covering all sub-measures together. Also the report will contain option for filtering for regions.

#### 2.7.2.4. General detailed data report

The general detailed data report shall contain the list of all operations (applications) with values for each operation:

- **row number,**
- **data on sub-measure:** code of the measure, title of the measure, code of the sub-measure, name of the sub-measure,
- **data on applicant:** ITNR<sup>2</sup>, name, address, contact data, legal status, type of legal entity, female (Y/N), young farmer (Y/N), size of the applicant (micro, small, medium, large), rural applicant (Y/N),
- **data on application:** date of application, date of rejection, date of contract, date of final payment, date of first payment, date of last amendment, call title, call date,
- **location of the holding of applicant:** name of municipality, name of region, ANC (Y/N),
- **location of the project:** list of municipalities of the project, list of regions of the project, ANC of the project (Y/N),
- **information on project:** description of the project, type of investment (3 possibilities - equipment, services, both), project category,
- **financial aspects of the project:**
  - total cost of the project applied
  - total cost of the project rejected
  - share of total cost of the project rejected to total costs of the project applied
  - total cost of the project paid
  - share of total cost of the project paid to total costs of the project applied
  - amount due by state budget applied,
  - amount due by state budget rejected,
  - share of amount due by state budget rejected to amount due by state budget applied,
  - amount due by state budget paid,
  - share of amount due by state budget paid to amount due by state budget applied,
  - amount due by beneficiary applied,
  - amount due by beneficiary rejected,
  - share of amount due by beneficiary rejected to amount due by beneficiary applied,
  - amount due by beneficiary paid,
  - share of amount due by beneficiary paid to amount due by beneficiary applied.
- **details from the business plan and monitoring** all years starting from a year before the call and ending 5 years after project completion\*:
  - value added,

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<sup>2</sup> ITNR – an english abbreviation for the Identification code of agricultural holding

- count of employees males,
- count of employees females,
- count of employees total,
- sales of own products.
- **number of payments,**
- **number of amendments,**
- **reason for rejection,**
- **renewable energy:** included in the project (Y/N), cost of the project part dedicated to renewable energy, capacity of renewable energy production in MW,
- **other information:** disabled people respected(Y/N), share of the employed disabled people, number of jobs created in supported operations (projects),
- organic production(Y/N), innovation (Y/N), innovation description,
- **memberships:** member of a cooperative (Y/N), list of names of cooperatives, member of a LAG (Y/N), list of names of LAGs.

The final content of the general detailed data report will be confirmed during the analysis phase of the implementation of IAIP.

**2.7.2.5. Special additions to general data reports**

In addition to general data reports, for some measures and sub-measures the IAIP shall also contain special additions to those general data reports. MAFWE will decide for each sub-measure whether the additions should be included in the general reports or in separate reports. In some cases, the specified additions may have 1 to N cardinality to the individual rows of the general data reports and in this case, supplier will suggest to the MAFWE the final solution (e.g., multiple occurrence of the same row, separate report, list of items with additional values in brackets or similarly separated).

Additions are defined only for RD measures and sub-measures. Similar additions will be included in the IAIP also for the IPARD and Fisheries programs, which will be defined and confirmed during the analysis phase of the implementation of IAIP.

**Additions defined for the RD measures and sub-measures:**

RD measure or sub-measure	Additions to the general detailed data report specific to the sub-measure	Additions to the general summary data report 1 specific to the sub-measure
111 - Vocational training	Type of training (courses, seminars), name of the training provider, amount of eligible cost, description of the types of costs (e.g. cost for venues, operational costs, costs for printed materials), number of participants, professional background of the trainer, years of experience of the trainer, length of the training in hours, region, and municipality of training	In columns for each type of training, the number of participants, number of trainings, costs of training

112 - Assisting young farmers get started in agriculture	Applicants working status (employed/unemployed), greenhouses (Y/N), perennial cultures (Y/N), date when applicant was first recorded as holder of agricultural holding, educational background, production by applicant according to GAP (Y/N)	Number of projects with employed applicants, number of projects targeting unemployed applicants, number of projects with greenhouses, number of projects with perennial cultures, count of farmers producing according to GAP
113 - Young farmers in processing of agro-food products	Applicants working status (employed/unemployed), date when applicant was first recorded as holder of agricultural holdings, educational background, production by applicant according to GAP (Y/N), net present value of the project, internal rate of return of the project, period of return on investment	Number of projects with employed applicants, number of projects with unemployed applicants, number of projects with greenhouses, number of projects with perennial cultures, net present value of projects, weighted internal rate of return of the project, weighted period of return on investment, count of farmers producing according to GAP
115 - Support for an active female member of the agricultural household	Single parent (Y/N), gross annual income	Number of single parents, gross annual income
121 - Investment for modernization of agricultural holdings	Type of equipment, cost of equipment, type of agro-machinery, cost of agro-machinery, description of construction, cost of construction, cost of equipment for renewable energy, type of equipment for renewable energy, description of production activities, description of postproduction activities, working hours of machinery for all years covering 5 years period from the purchase of the equipment or machinery	
121.1 - procurement of livestock	For every application one or more breeds can be applied for; for every breed: name of the breed, count of animal heads, count of female/male animals, countries of origin, count of hybrid animals (pigs), time of purchase	For each breed count of animal heads, count of female/male animals, count of hybrid animals (pigs)

121.2. - raising new crops	For every application one or more cultures and varieties can be applied for; for every culture and variety: time of purchase, area in ha, number of plants, external costs for constructions, list of cadastral parcel	For every culture and variety area in ha, number of plants, external costs for constructions
121.3 - procurement of bee queens and bee swarms	Count of bee queens, count of bee swarms, cost of purchased equipment, type of equipment	Count of bee queens, count of bee swarms, cost of purchased equipment
121.4 - purchase of tractors	Type of production (orchard, vineyard, permanent grass, arable land etc.), type of agro-machinery, power of the engine, area of agricultural land (applied for direct payments/total area), working hours of machinery for all years covering 5 years period from the purchase of the equipment or machinery, number of tractors purchased	Average power of the engine, Total area of agricultural land (applied for direct payments/total area), total working hours of machinery for all years covering 5 years period from the purchase of the equipment or machinery, number of tractors purchased
121.5. - procurement of drip irrigation, construction of wells and other surface water intakes	Cost of external services, cost of equipment on the surface, cost of equipment underground, cost of construction, culture type, affected area, list of crops from rotation plan with areas covered by each crop in brackets and divided by comas, type of license to use the water	Cost of external services, cost of equipment, cost of construction, affected area per type of culture and type of license for the use of the water
124.1.- capital investments for water management infrastructure.	Affected area	Affected area
124.2.- other investments for water management infrastructure	Affected area	Affected area
124.3. - Investments for state-owned pastures	Affected area	Affected area
124.4. - access to agricultural land	Affected area	Affected area
124.5 - agricultural land consolidation	Affected area	Affected area

<p>131 - Economic association of agricultural holdings for the joint performance of the agricultural activity</p>	<p>Count of members (from register of associations), type of association, cost for establishment, cost for machinery, operational costs, promotional costs, organic (Y/N), PGO/PGI (Y/N)</p>	<p>For each type of association count of members (from register of associations), cost for establishment, cost for machinery, operational costs, promotional costs, count of organic, count of PGO/PGI</p>
<p>213 - Helping to preserve rural areas and their traditional features</p>	<p>Count of employees, count of sheep, count of bovine, count of goats, hectares with preserved traditional fabric of countryside</p>	<p>Count of employees, count of sheep, count of bovine, count of goats, hectares with preserved traditional fabric of countryside</p>
<p>214 - Assistance in carrying out the agricultural activity for the protection and improvement of the environment</p>	<p>Type of activity, affected area</p>	<p>Affected area by type of activity</p>
<p>214.2 - establishing, monitoring and analyzing the conditions of indigenous livestock breeds and keeping and providing mandatory genetic reserves of indigenous livestock breeds</p>	<p>Type of activity</p>	
<p>214.3 - conservation of genetic diversity of indigenous livestock breeds (cattle Busha, sheep Karakachanska, Ovcepolska and Sharplaninska, goat-Balkanian goat, Sheppard dog, and buffalo – domestic buffalo</p>	<p>Type of activity</p>	
<p>321 - Improving the quality of life in rural areas</p>	<p>Affected population by project (from SSO based on affected municipality of the location of the project)</p>	<p>Affected population by project (from SSO based on affected municipality of the location of the project), share of affected population to total population</p>

322 - Reconstruction and development of villages	Affected population by project (from SSO based on affected municipality of the location of the project)	Affected population by project (from SSO based on affected municipality of the location of the project), share of affected population to total population
323 - Preserving and promoting traditional values in rural areas	Affected population by project (from SSO based on affected municipality of the location of the project)	Affected population by project (from SSO based on affected municipality of the location of the project), share of affected population to total population
413 - Implementation of strategies for local development of rural areas	Cost of trainings, administrative costs, operational costs, costs of realization of strategies, cost of IT, affected population by the project (from SSO based on affected municipality of the location of the project)	Cost of trainings, administrative costs, operational costs, costs of realization of strategies, cost of IT, affected distinct (prevention of double counting) population by the project (from SSO based on affected municipality of the location of the project)
TS* 1.1.- Organizing and conducting events and fairs for promotion of agricultural products in and outside of the Republic of North Macedonia	Cost of space rental, cost of equipment rental, cost of marketing materials, cost of media	Cost of space rental, cost of equipment rental, cost of marketing materials, cost of media
TS* 1.2. - Participation in fairs manifestation and fairs of agricultural producers and processors in and outside of the Republic of North Macedonia	Cost of space rental, cost of equipment rental, cost of marketing materials, cost of media, cost of experts, business to business type of event (Y/N), international event (Y/N)	Cost of space rental, cost of equipment rental, cost of marketing materials, cost of media, cost of experts, count of business to business type of events, count of international events
TS* – 2 Interest rate subsidy	Amount of loan, interest rate, period of loan covered	Total amount of loans, weighted interest rate, weighted period of loan covered

### 2.7.3. Specification of data reports foreign trade statistics

General information:

- users will be able to restrict data displayed in all data reports to basic agricultural products, processed agricultural products, products from fisheries and aquaculture or to all agricultural products (this is a characteristics defined at the 8 digits tariffs level). MAFWE will provide the lists of tariffs relevant to basic agricultural products, processed agricultural products, products from fisheries and aquaculture and the IAIP will be designed in a way that MAFWE will be able to amend the above mentioned lists used for respective data reports
- IAIP will provide end-users with the sorting functionality for all displayed columns
- access to data reports will be not restricted; all MAFWE personnel with login to the IAIP will be allowed to access all data reports
- supplier can separate yearly and monthly reports
- monthly and yearly data from SSO will be used as data sources for the specified data reports
- most of the data reports contain references to current data reports (e.g. TAB\_15) in order for the better orientation of the end-users
- MAFWE may require from IAIP supplier to implement some data reports as OLAP cubes.

#### 2.7.3.1. Link to M&E indicators:

- Specified data reports will cover indicator I-I3 - Agricultural imports and exports impact. The MAFWE will specify to the IAIP supplier, which values should be included in the indicator during the implementation phase of the IAIP.

Data reports:

1. TAB\_15: List of **tariffs** (according to TARIC nomenclature) for selected year or selected month (starting from 2007) including TARIC code for 10 digits, name for the TARIC code item and for each tariff value of **IMPORTS** in kg, EUR, USD.
2. TAB\_16: List of **tariffs** (according to TARIC nomenclature) for selected year or selected month (starting from 2007) including TARIC code for 10 digits, name for the TARIC code item and for each tariff value of **EXPORTS** in kg, EUR, USD.
3. TAB\_17: List of **countries with tariffs** (according to TARIC nomenclature) for selected year or selected month (starting from 2007) including TARIC code for 10 digits, name for the TARIC code item and for each country and respective tariff value of **IMPORTS** in kg, EUR, USD. Only rows included with values larger than 0.
4. TAB\_18: List of **countries with tariffs** (according to TARIC nomenclature) for selected year or selected month (starting from 2007) including TARIC code for 10 digits, name for the TARIC code item and for each country and respective tariff value of **EXPORTS** in kg, EUR, USD. Only rows included with values larger than 0.
5. TAB\_19: List of **tariffs** (according to TARIC nomenclature) for selected year or selected month (starting from 2007) including TARIC code for 10 digits, name for the TARIC code item and for each tariff value of **IMPORTS from EU countries** in kg, EUR, USD.
6. TAB\_20: List of **tariffs** (according to TARIC nomenclature) for selected year or selected month (starting from 2007) including TARIC code for 10 digits, name for the TARIC code item and for each tariff value of **EXPORTS to EU countries** in kg, EUR, USD.
7. TAB\_21: List of **EU countries with tariffs** (according to TARIC nomenclature) for selected year or selected month (starting from 2007) including TARIC code for 10 digits,

- name for the TARIC code item and for each country and respective tariff value of **IMPORTS** in kg, EUR, USD. Only rows included with values larger than 0.
8. TAB\_22: List of **EU** countries with tariffs (according to TARIC nomenclature) for selected year or selected month (starting from 2007) including TARIC code for 10 digits, name for the TARIC code item and for each country and respective tariff value of **EXPORTS** in kg, EUR, USD. Only rows included with values larger than 0.
  9. Izvoz-Uvoz\_2008-202X (with sorting possibility covers also tables „Najznacajni IZVEZENI“ and „Najznacajni UZVEZENI“): List of **all tariffs** (according to TARIC nomenclature) for selected year (starting from 2007) including TARIC code for 4 digits, name for the TARIC code item and for each tariff value 3 sections of values: **EXPORTS**, **IMPORTS** and **TRADING BALANCE** with possibility to sort according to any selected column. The bottom of the report will contain the summarization row. Individual sections will contain following information:
    - a. For **EXPORTS** section for each year sorted horizontally ascending (2007-202X) and for each tariff Value in kg, Value in EUR, Price in EUR for Kg and the Share of the Value in EUR on Total value of exports in EUR for the given year
    - b. For **IMPORTS** section for each year sorted horizontally ascending (2007-202X) and for each tariff Value in kg, Value in EUR, Price in EUR for Kg and the Share of the Value in EUR on Total value of imports in EUR for the given year.
    - c. For **TRADING BALANCE** section for each year sorted horizontally ascending (2007-202X) and for each tariff difference between the value of exports in EUR and value of imports in EUR for a given year and tariff.
  10. Application will produce report based on the following criteria selected by the user:
    - a. users will be able to select level of tariffs nomenclature (2, 4, 6, 8, 10 digits) and at the selected level of tariff nomenclature single interval of tariff nomenclature from list of tariff nomenclature ordered according to ascending tariff code
    - b. users will be able to restrict data displayed in the report to basic agricultural products, processed agricultural products, fisheries or to all agricultural products (this is a characteristics defined at the 10 digits tariffs level)
    - c. users will be able either to include or not to include dimension of the countries in the report
    - d. users will be able either to select one or more countries for which the report should be produced or to select trading block of countries (EU-27, EU-28, EU-28 until 2019 and EU-27 from 2020, CEFTA, ASEAN, MERCOSUR, NAFTA etc.), for which the data should be displayed in the report. The application will provide the functionality to update the contents of the trading blocks of countries and create new trading blocks of countries to be selected in the report production
    - e. users will be able select one or more years for which the report should be produced, years dimension will be displayed preferably in the header of the report; users will be able to choose between monthly or yearly data to be displayed
    - f. users will be able to select which values to be included in the report
      - i. import (value in kg, value in EUR, value in USD, share of the total kg, share of the total EUR)
      - ii. export (value in kg, value in EUR, value in USD, share of the total kg, share of the total EUR)
      - iii. trading balance (difference between export and import in kg, in EUR)

11. List of all **countries** and for each country value of **IMPORTS, EXPORTS and TRADE BALANCE** in kg, EUR, USD, share of imports on total imports in EUR in %, share of exports on total exports in EUR in % for agricultural products in given years (starting from 2007)
12. List of tariff codes for all basic agricultural products, tariff names and for each tariff code for selected 4 years period interval, value of **IMPORTS** in given years in kg, EUR and in the last two columns average value of imports in kg and average value of imports in EUR for given 4 years period interval
13. List of tariff codes for all basic agricultural products, tariff names and for each tariff code for selected 4 years period interval, value of **EXPORTS** in given years in kg, EUR and in the last two columns average value of exports in kg and average value of imports in EUR for given 4 years period interval.

### **2.7.3.2. Specification of data reports for FADN**

The FADN is data source for 2 result and 2 M&E indicators:

- I-R1 - Family farm income (result indicator)
- I-R3 - Economic farm size (FADN) – Strategy indicator (Table 6)
- I-I1 - Agricultural entrepreneurial income (impact indicator)
- I-I2 - Total factor productivity in agriculture (impact indicator)

The evaluation of the above-mentioned indicators has to incorporate some adjustments of the sample used for calculation of the values of indicators (same panel or adjustment to population data using stratified sampling methods). The result of the calculation of above-mentioned indicators will be also part of the IAIP. IAIP will also contain the data reports, which can be used for the calculation of the indicators.

Data report specification (covers also analytical table requirements for counterfactual analysis, especially for large investment measures of RD and IPARD):

- List of FADN respondents (farmers) with their identification code through (including IDBR and ITNR, which are not included in the FADN system yet), region, municipality, economic size, production type, year of data, and for each FADN respondent and year of data, values for FADN variables (up to several hundred variables), participation in RD, IPARD and Fisheries and Aquaculture sub-measures (for major sub-measures defined by MAFWE, for each sub-measure values\*: Y/N for participation, total cost of the project, date of call, date of application, date of final payment)

\*If an applicant has applied for a certain sub-measure more than once, the values will contain the minimal date of call, minimum date of application and maximum date of final payment and sum of total costs of projects for all applicant participations in the respective sub-measure. The information on participation in sub-measures will be duplicated but could facilitate the identification of the best panel for the counterfactual analysis.

### **2.7.3.3. Specification of data reports from Farm register**

The following data reports are specified in IAIP from data source farm register:

- List of plant species and their varieties in orchards with values for each plant variety: total area covered, number of trees, average number of trees per hectare of orchard
- List of wine varieties in vineyards with values for each plant variety: total area covered, number of roots, average number of roots per hectare of vineyard

- List of regions and plant species in orchards (apples, pears, nuts, cherries, peaches etc.) and for each region plant species values total area covered, number of trees, average number of trees per hectare of orchard
- List of regions and for each region values: total area of vineyards covered, number of wine roots, average number of roots per hectare of vineyard
- List of regions and for each region values: total farmers count, total applicants for direct payments count, share of applicants for direct payments to total count of farmers
- List of animal species and their categories and for each animal species and category number of animals registered in system for animal identification
- List of regions and for each region values: number of heads for bovine cattle, number of heads for sheep, number of heads for goats, number of heads for pigs, number of heads for horses

#### **2.7.3.4. Specification of data reports for AMIS**

General requirement for data reports:

- During the analysis phase of the IAIP implementation, the visualization requirements will be collected by the IAIP supplier and approved by MAFWE.

Following data reports are specified in IAIP from data source AMIS:

- List of commodities for selected grouping of commodities (vegetables, milk products, etc.) and for every commodity, average price from all observations for each available time point (day, week, month, etc.) of selected time interval, which can spread over longer time periods (e.g. several years).
- List of commodities for selected one or more commodities and for every commodity, average price from all observations for each available time point (day, week, month, etc.) of selected time interval, which can spread over longer periods of time.

#### **2.7.3.5. Specification of data reports for SSO surveys**

The following data reports are specified in IAIP from SSO surveys (each data report contains the link to the respective data report at SSO Makstat portal):

- List of cereals, industrial crops, vegetables, fruit, and grapes and for each plant product, values of production in tones, all values by years (2000-202X)<sup>3</sup>
- Numbers of livestock, poultry, and beehives by years (2000-202X)<sup>4</sup>
- Production of meat, by meat categories, by years (2000-202X)<sup>5</sup>
- Total number of livestock, poultry and beehives, by regions and by years (2000-202X)<sup>6</sup>

3

[https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat\\_Zemjodelstvo\\_RastitelnoProizvodstvo/125\\_RastPro\\_Mk\\_PoseviVk\\_ml.px/](https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat_Zemjodelstvo_RastitelnoProizvodstvo/125_RastPro_Mk_PoseviVk_ml.px/)

4

[https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat\\_Zemjodelstvo\\_DobitocnoProizvodstvo/125\\_DobPro\\_Mk\\_DobZivPc\\_ml.px/](https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat_Zemjodelstvo_DobitocnoProizvodstvo/125_DobPro_Mk_DobZivPc_ml.px/)

5

[https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat\\_Zemjodelstvo\\_DobitocnoProizvodstvo/225\\_DobPro\\_Mk\\_Meso\\_ml.px/](https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat_Zemjodelstvo_DobitocnoProizvodstvo/225_DobPro_Mk_Meso_ml.px/)

6

[https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat\\_Zemjodelstvo\\_DobitocnoProizvodstvo/175\\_DobPro\\_Reg\\_DobZivPc\\_ml.px/](https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat_Zemjodelstvo_DobitocnoProizvodstvo/175_DobPro_Reg_DobZivPc_ml.px/)

- Milk production by years (2000-202X)<sup>7</sup>
- Number of cattle, by categories, by region, by years <sup>8</sup>
- List of regions and for each region, values: number of egg-laying hens, average pieces per hen, total egg production in 1,000 pieces, all by years (2016-202X) <sup>9</sup>
- List cereals, industrial crops, vegetables, fruit, and grapes and for each plant product, values: total area in hectares, area fully converted, area in conversion, total production in tones, production organic in tones, production in the conversion period in tones, all values by years (2013-202X)<sup>10</sup>
- List of livestock species and for each livestock species (cattle, sheep, goats), values of count of heads in organic production, count of heads in conversion, count of heads in fully converted production, quantity of milk in organic production in liters, count of offspring in organic production, all values by years (2013-202X)<sup>11</sup>
- Number of beehives and kg of honey produced by years in organic system, in conversion period and total of both (2013-202X)<sup>12</sup>

### 2.7.3.6. Specification of data report for M&E indicators not covered by specified data reports

The IAIP will also include one or more data reports containing the values for the following set of indicators not covered by the above specified data reports on a yearly basis:

- II-I1 - Greenhouse gas emissions from agriculture
- II-I2 - Ammonia emissions from agriculture
- II-I3 - Soil organic carbon in agricultural land (PMEF)
- II-I4 - Gross nutrient balance on agricultural land/Nitrates in groundwater
- II-I5 - Farmland bird index
- III-I1 - Rural population and its age structure (SSO)
- III-I2 Rural GDP per capita (SSO)
- III-I3 Rural employment (SSO)
- III-I4 Poverty rate in rural areas (SSO)

7

[https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat\\_Zemjodelstvo\\_DobitocnoProizvodstvo/275\\_DobPro\\_Mk\\_Mleko\\_ml.px/](https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat_Zemjodelstvo_DobitocnoProizvodstvo/275_DobPro_Mk_Mleko_ml.px/)

8

[https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat\\_Zemjodelstvo\\_DobitocnoProizvodstvo/325\\_DobPro\\_Reg\\_Goveda\\_ml.px/](https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat_Zemjodelstvo_DobitocnoProizvodstvo/325_DobPro_Reg_Goveda_ml.px/)

9

[https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat\\_Zemjodelstvo\\_DobitocnoProizvodstvo/350\\_DobPro\\_Reg\\_Jajca\\_ml.px/](https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat_Zemjodelstvo_DobitocnoProizvodstvo/350_DobPro_Reg_Jajca_ml.px/)

10

[https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat\\_Zemjodelstvo\\_OrganskoProizvodstvo/125\\_Zem\\_Mk\\_oRast\\_ml.px/](https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat_Zemjodelstvo_OrganskoProizvodstvo/125_Zem_Mk_oRast_ml.px/)

11

[https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat\\_Zemjodelstvo\\_OrganskoProizvodstvo/130\\_Zem\\_Mk\\_DobitocnoOrgPro\\_ml.px/](https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat_Zemjodelstvo_OrganskoProizvodstvo/130_Zem_Mk_DobitocnoOrgPro_ml.px/)

12

[https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat\\_Zemjodelstvo\\_OrganskoProizvodstvo/135\\_Zem\\_Mk\\_PcelSemOrgProMed\\_ml.px/table/tableViewLayout2/](https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat_Zemjodelstvo_OrganskoProizvodstvo/135_Zem_Mk_PcelSemOrgProMed_ml.px/table/tableViewLayout2/)

- III-I5 Income and living conditions of households (SSO)

The data sources for the above-mentioned M&E indicators are provided in a form of set of values at national or regional level by different governmental institutions on a yearly basis.

#### **2.7.4. Business Intelligence (BI) Licenses**

The Supplier shall provide ten (10) concurrent Business Intelligence (BI) licenses required for the implementation and operational use of the BI platform under this project.

The concurrent licensing model shall allow at least ten (10) authorized users to access and use the BI solution simultaneously, in accordance with the defined access rights and user roles. The licenses must enable full operational use of the BI platform in line with the functional and technical requirements specified in the Technical Specifications and related project documentation.

The Supplier shall ensure that the proposed licensing model supports scalability and future expansion, if required, without restrictions that would limit the intended use of the BI solution within the scope of this project.

All licensing costs, including initial acquisition, subscription (if applicable), as well as any mandatory maintenance, support, and update fees necessary to keep the BI solution fully operational during the warranty period of two (2) years, starting from the date of Final System Acceptance Report, shall be clearly included in the Supplier's Financial Offer.



## 2.8. Training and Training Materials

Training is a key factor for the successful implementation, adoption, and long-term sustainability of the IAIP and its constituent systems, including SALMIS. A structured and well-planned training program ensures that administrators, sector specialists, and end-users acquire the necessary knowledge and skills to effectively operate, maintain, and further develop the systems.

### 2.8.1. General Training and Training Materials Requirements

The following general requirements apply to **all training activities** related to IAIP and SALMIS, unless otherwise specified:

Number	Feature	Type
<b>TTM.01.01</b>	The Supplier/Bidder shall propose a comprehensive training schedule aligned with the overall implementation schedule and preliminary project plans.	<b>M</b>
<b>TTM.01.02</b>	One training day shall consist of <b>eight (8) classroom hours</b> .	<b>M</b>
<b>TTM.01.03</b>	Training may be delivered onsite (physical presence) at premises provided by MAFWE or online, subject to prior agreement with MAFWE.	<b>M</b>
<b>TTM.01.04</b>	The number of trainees per group shall <b>not exceed 10 participants</b> , unless otherwise agreed with MAFWE.	<b>M</b>
<b>TTM.01.05</b>	All training sessions shall include: <ul style="list-style-type: none"> <li>– Presentation of concepts and system functionalities</li> <li>– Practical, hands-on demonstrations</li> <li>– Questions and Answers (Q&amp;A) sessions</li> </ul>	<b>M</b>
<b>TTM.01.06</b>	The Supplier shall prepare and deliver complete training materials, including: <ul style="list-style-type: none"> <li>– Presentation slides</li> <li>– User manuals and handouts</li> <li>– Practical exercises</li> <li>– Online and printable materials</li> </ul> All training materials shall be developed and delivered in electronic format, and where appropriate in printable format.	<b>M</b>
<b>TTM.01.07</b>	All training materials shall be delivered in Macedonian language and made available to MAFWE at least five (5) working days prior to the scheduled training session.	<b>M</b>
<b>TTM.01.08</b>	Training plans and materials shall be submitted to MAFWE for review and comments, in accordance with the deadlines defined in the implementation schedule.	<b>M</b>

<b>TTM.01.09</b>	MAFWE shall establish a Working Group to review the submitted training materials. The Supplier shall address all comments and objections within the agreed deadlines and resubmit the corrected materials for final approval.	<b>M</b>
<b>TTM.01.10</b>	Certificates shall be issued by the Supplier to all participants who successfully complete the training sessions.	<b>M</b>
<b>TTM.01.11</b>	<p>Each training session shall be evaluated by the Client based on written feedback from participants. The Supplier shall prepare:</p> <ul style="list-style-type: none"> <li>– A training report with recommendations</li> <li>– A consolidated Q&amp;A report</li> </ul> <p>The Client shall prepare the final evaluation summary.</p>	<b>I</b>

### 2.8.2. IAIP (Integrated Agricultural Information Platform) Training Requirements

The training requirements below apply to the **IAIP as a whole**, including its core platform services, shared registries, analytics, interoperability mechanisms, and administrative functions.

<b>Number</b>	<b>Feature</b>	<b>Type</b>
<b>TTM.02.01</b>	<p>The training schedule for IAIP shall clearly define training courses by:</p> <ul style="list-style-type: none"> <li>– User category</li> <li>– Duration</li> <li>– Training type (hands-on / overview)</li> <li>– Recommended location</li> </ul> <p>The final training location shall be agreed with MAFWE during the implementation phase and may include MAFWE premises or suitable facilities proposed by the Supplier.</p>	<b>M</b>
<b>TTM.02.02</b>	<p>At a minimum, the following IAIP training courses shall be delivered, subject to final approval by MAFWE:</p> <ul style="list-style-type: none"> <li>– <b>System Administrators</b> (minimum 3 days, hands-on, onsite): Installation, configuration, security, backup procedures, monitoring, and overall system maintenance.</li> </ul>	<b>M</b>

	<ul style="list-style-type: none"> <li>– <b>Analytics / BI Users</b> (minimum 2 days, hands-on, onsite): Creation, management, and publication of reports, dashboards, and analytical queries.</li> <li>– <b>Sector-specific Users</b> (1–3 days per sector, depending on complexity): Establishment and management of registries, operational use of IAIP modules.</li> <li>– <b>External Users</b> (1–2 days): Overview of IAIP functionalities, access to shared data and services, and interoperability mechanisms.</li> <li>– <b>Train-the-Trainers</b> (minimum 3 days, hands-on, onsite): Training of designated key users to ensure sustainable internal capacity for continuous training of new staff.</li> </ul> <p>Certificates shall be issued for all IAIP training courses.</p> <p>The approximate number of participants for each training category will be confirmed during the implementation planning phase in coordination with MAFWE.</p>	
<b>TTM.02.03</b>	The Bidder shall propose a set of training-related change management activities aimed at supporting user adoption and effective rollout of the IAIP platform.	<b>M</b>

### 2.8.3. SALMIS Training Requirements

The training requirements below apply **specifically to SALMIS**, as a functional module within the IAIP.

<b>Number</b>	<b>Feature</b>	<b>Type</b>
<b>TTM.03.01</b>	<p>The Supplier shall deliver user-oriented SALMIS training for staff from:</p> <ul style="list-style-type: none"> <li>– 33 MAFWE branch offices</li> <li>– 10 PEMP branch offices</li> <li>– MAFWE and PEMP headquarters</li> </ul> <p>The total duration of SALMIS end-user training shall be a minimum of 10 training days (cumulative), organized in appropriate batches and sessions to ensure full coverage of all designated user groups.</p>	<b>M</b>

<b>TTM.03.02</b>	<p>Training shall also be provided for <b>external institutions</b> involved in land management and data exchange, such as:</p> <ul style="list-style-type: none"> <li>– Agency for Real Estate Cadastre</li> <li>– Central Registry</li> <li>– Ministry of Digital Transformation</li> <li>– Other relevant institutions</li> </ul> <p>The duration of these trainings shall be <b>minimum 2 days</b>, adjusted according to the level of system access and functionalities granted.</p>	<b>M</b>
<b>TTM.03.03</b>	<p>The Supplier shall deliver <b>technical training for SALMIS system administrators</b> for a group of <b>minimum 3 users</b>, with a duration of <b>at least 3 days</b>.</p>	<b>M</b>
<b>TTM.03.04</b>	<p>Technical training shall cover all SALMIS system administration and management functions and shall be organized for MAFWE and PEMP headquarters staff.</p>	<b>M</b>
<b>TTM.03.05</b>	<p>Upon completion of SALMIS trainings, the Supplier shall submit <b>video recordings</b> of the delivered training sessions. MAFWE and PEMP may publish these materials on internal platforms for institutional use.</p>	<b>M</b>

## 2.9. Sustainability and Post-Project Ownership

The long-term sustainability of the Integrated Agricultural Information Platform (IAIP) is a key objective of the system implementation. While the implementation contract defines a two-year warranty and maintenance period, the IAIP platform is expected to remain a core information system supporting agricultural administration, monitoring, and policy implementation well beyond the duration of the initial contract period.

This section establishes requirements aimed at ensuring that the Ministry of Agriculture, Forestry and Water Economy (MAFWE) can sustainably operate, maintain, and further develop the IAIP platform following the completion of the warranty and maintenance period defined in the contract.

### 2.9.1. Institutional Capacity Development

In addition to the training activities defined in the Training and Knowledge Transfer section of this Technical Specification, the Supplier shall support the development of MAFWE's internal capacity to manage and operate the IAIP platform.

This shall include activities aimed at enabling designated MAFWE staff to perform key operational tasks related to system administration and first-line support.

The capacity development activities shall include, where applicable:

- Administration of IAIP platform components and user management;
- Basic configuration and management of application modules;
- Monitoring of system performance and operational status;
- Management of data administration tasks and configuration parameters.

The Supplier shall provide documentation and practical training materials necessary to support these activities, enabling MAFWE to progressively assume operational responsibility for routine system administration functions.

The Supplier shall ensure structured and comprehensive knowledge transfer to MAFWE personnel to enable independent operation, administration, and maintenance of the IAIP platform.

This shall include, in addition to the above activities, the transfer of system configuration knowledge, operational procedures, and maintenance practices, as well as the provision of complete, up-to-date, and maintainable technical and user documentation.

Knowledge transfer activities shall be planned, documented, and completed prior to the end of the implementation period.

## **2.9.2. Total Cost of Ownership and Operational Planning**

### **2.9.2.1. TCO and Operational Planning**

To support medium-term sustainability planning, the Supplier shall provide an indicative Total Cost of Ownership (TCO) projection for the IAIP platform.

This projection shall cover an indicative period of at least five (5) years, starting after the completion of the two (2)-year warranty period, and shall identify the principal cost categories associated with operating the platform following the completion of the implementation contract.

The projection shall include indicative estimates for:

- Software license renewals and subscriptions;
- Infrastructure operation and hosting requirements where applicable;
- System maintenance and technical support requirements;
- Periodic upgrades or updates of platform components where relevant.

The purpose of this projection is to support MAFWE in planning and budgeting for the continued operation and evolution of the IAIP platform.

### **2.9.2.2. Recurrent Costs**

To complement the TCO projection and support long-term financial planning, the Proposers shall provide additional indicative information on recurrent costs.

The Proposers shall include the cost of 24-month Warranty maintenance and support services as part of their proposal price. Payment for Warranty services shall be made separately under the Contract, following the full operational acceptance of the System.

In addition, the Proposers shall submit a separate indicative proposal for Post-Warranty maintenance and support services for a period of 60 months (5 years), starting from the completion of the warranty period.

This indicative proposal:

- is required for information purposes only;
- shall not be considered for evaluation;
- shall not constitute a commitment for future contracting.

The purpose of this indicative proposal is to provide MAFWE with a reference for planning future budget allocations and assessing market conditions for maintenance and support services.

The Purchaser reserves the right to enter into a separate agreement for Post-Warranty maintenance and support services with the successful Supplier or any other qualified provider, subject to applicable procurement procedures, satisfactory performance, and future operational needs.

The Proposers are expected to ensure that the pricing for Post-Warranty services reflects fair market conditions and is comparable to prevailing industry standards for similar systems and services. The Purchaser reserves the right to assess the reasonableness of such pricing and may benchmark it against comparable market offers. Operational Capacity and Sustainability

MAFWE shall ensure that appropriate internal capacity is established for the long-term operation, administration, and maintenance of the IAIP platform. This shall include the designation of technical, administrative, and functional roles responsible for system management, user support, and data governance.

The Supplier shall also provide recommendations for an appropriate operational and support model for the IAIP platform, including the allocation of responsibilities between MAFWE and external support providers where applicable.

### **2.9.2.3. Sustainability and Exit Plan**

Prior to the completion of the warranty and maintenance period, the Supplier shall develop, in coordination with MAFWE, a formal Sustainability and Exit Plan for the IAIP platform. This plan shall define the approach for the transition of full operational responsibility from the Supplier to MAFWE, ensuring continuity of service and long-term maintainability of the system.

The Sustainability and Exit Plan shall include, at a minimum:

- a description of the target operational model for system management and support;
- allocation of roles and responsibilities between MAFWE and any external support providers;

- confirmation of knowledge transfer completion and operational readiness of MAFWE staff;
- identification of any residual risks and mitigation measures;
- definition of support arrangements, if required, beyond the warranty period.

The plan shall be submitted for review and approval by MAFWE and shall be finalized prior to the expiration of the warranty period.

### **2.9.3. Documentation of Platform Dependencies**

To ensure long-term maintainability and transparency of the IAIP platform, the Supplier shall document all key platform dependencies, including third-party components and licenses used within the solution.

This documentation shall include, where applicable:

- Third-party software components and associated license models;
- Renewal requirements for commercial software licenses or subscriptions;
- Dependencies related to external systems, APIs, or interoperability interfaces;
- Technical components required for system operation.

The documentation shall form part of the technical documentation delivered at system acceptance and shall support the long-term maintainability and governance of the IAIP platform.

The Supplier shall ensure that such documentation is sufficient to enable MAFWE or a third party to maintain, extend, and operate the system without dependency on proprietary knowledge not formally documented.

Where third-party components are used, the Supplier shall ensure transparency of licensing conditions and renewal obligations, in order to support long-term sustainability and avoid unintended vendor lock-in.

## **2.10. Project Documents Requirements**

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The Supplier shall prepare, maintain and submit a comprehensive set of project documentation supporting the planning, implementation, monitoring, validation and operational readiness of the Integrated Agricultural Information Platform (IAIP).

The documentation shall cover all IAIP components and modules, including but not limited to core registries, SALMIS, domain-specific datasets, interoperability services, GIS components, reporting and analytics, and supporting infrastructure.

The purpose of the documentation is to ensure:

- effective system use by end-users
- efficient system administration and maintenance by MAFWE personnel
- long-term sustainability, scalability, and transferability of the IAIP
- independence of the Purchaser from the Supplier after project completion

All project-related documentation, source code, training materials, and media delivered under this contract shall become the exclusive property of the Purchaser.

The Supplier may request prior written approval from the Purchaser in case of any need to copy, publish, or distribute contract-related documentation or materials.

All documentation shall be submitted in electronic format unless otherwise specified.

The submission timeline for the documents listed in this chapter shall be aligned with the Implementation Schedule Table and the phased implementation framework defined in Chapter 4.1 – Phased Implementation Strategy.

The deliverables defined in this chapter constitute the primary contractual documentation required for verification of implementation progress, phase acceptance and milestone-based payments.

### 2.10.1. Project Management Deliverables

Project management documentation supports planning, coordination, monitoring and reporting of project implementation activities. These documents enable MAFWE to monitor implementation progress, identify risks, and verify that the project is progressing in accordance with the approved implementation plan.

Document Title	Description	Submission Timeline
Project Inception Report	Initial report describing project organization, implementation methodology, governance structure and communication procedures	Within 3 weeks after project start
Institutional Readiness Review Report	Document that assesses an organization's capacity, processes, and preparedness to effectively adopt, operate, and sustain a new system.	Within 4 weeks after project start
Project Plan	Detailed project plan aligned with the Implementation Schedule Table	Within 6 weeks after project start
Project Governance and Communication Plan	Definition of project governance structure and communication procedures between stakeholders	Within 7 weeks after project start
Monthly Progress Reports	Summary of project progress, completed	Continuously updated on a monthly basis

	activities, risks and mitigation measures	
Risk Management Log	Identification and monitoring of project risks and mitigation actions	Continuously updated on a monthly basis
BI Analytical Workshops Report	Consolidated report documenting analytical workshops, including identified use cases, validated datasets, defined indicators, dashboards and reporting outputs	Within 29 (twenty-nine) weeks after project start

### 2.10.2. Technical Planning and Quality Assurance Deliverables

Technical planning documentation defines the methodologies, procedures and quality assurance mechanisms that will guide the technical implementation of the IAIP platform.

Document Title	Description	Submission Timeline
Quality Control and Testing Plan	Definition of testing methodology, validation procedures and acceptance testing framework	Early project phase (within 2 weeks from the commencement of each individual project phase)
Data Migration Strategy	Detailed procedures for migration of legacy and temporary datasets into IAIP	At least 2 weeks prior to the data migration activities for the respective phase.
Data Quality Assurance Plan	Methodology for data profiling, cleansing and validation	At least 2 weeks prior to the data migration activities for the respective phase.
Change Management Strategy	Organizational transition plan supporting adoption of IAIP by MAFWE personnel	Within 4 weeks from the start of the implementation of the relevant phase
Interoperability Implementation Plan	Technical approach for interoperability services and integration with external institutions and NIP	Within 4 weeks from the start of the implementation of the relevant phase
Security and Access Control Plan	Definition of system security architecture and access control procedures	Within 4 weeks from the start of the implementation of the relevant phase

### 2.10.3. Phase Completion Deliverables

Each implementation phase defined in Chapter 4.1 shall conclude with formal verification of completion of activities and deliverables associated with that phase.

Each Phase Completion and Acceptance Report shall include:

- summary of completed implementation activities
- confirmation of successful deployment of system components
- results of system testing and validation
- confirmation of operational readiness of the implemented components
- confirmation that all deliverables associated with the respective phase have been completed

Phase	Deliverable	Submission Timeline
Phase 1	Infrastructure Deployment Completion and Acceptance Report	Within 14 weeks from the commencement of the project.
Phase 2	FR and LPIS Implementation Completion and Acceptance Report	Within 38 weeks from the commencement of the project.
Phase 3	SALMIS Implementation Completion and Acceptance Report	Within 39 weeks from the commencement of the project.
Phase 4	Legacy Systems Modernization Completion and Acceptance Report	Within 45 weeks from the commencement of the project.
Phase 5	New Registries Deployment Completion and Acceptance Report	Within 51 weeks from the commencement of the project.
Phase 6	BI Platform Implementation Completion and Acceptance Report	Within 55 weeks from the commencement of the project.
Phase 7	Interoperability Services Activation Completion and Acceptance Report	Within 56 weeks from the commencement of the project.

### 2.10.4. Technical Documentation and System Manuals

Technical documentation and system manuals provide the information required for the operation, administration, maintenance, troubleshooting, and future enhancement of the IAIP platform and its associated components. These documents ensure that MAFWE personnel and authorized third parties can effectively manage, support, and maintain the system throughout its operational lifecycle:

- System Architecture Documentation
- Database Schema and Data Model Documentation
- API and Integration Documentation
- GIS Infrastructure Documentation

- BI Platform and Data Warehouse Documentation
- System Configuration Documentation
- Security Configuration Documentation
- Backup and Disaster Recovery Procedures
- Reporting and Analytics Documentation

### **2.10.5. Source Code and Development Artifacts**

Source code and development artifacts constitute the core technical assets necessary to ensure transparency, maintainability, future enhancements, and long-term ownership of the IAIP platform. These deliverables enable MAFWE to retain full control over the implemented solution and provide a solid foundation for future maintenance, upgrades, system integrations, and further development.

Accordingly, the Supplier shall deliver the source code for all custom-developed IAIP components, including:

- application modules
- APIs and interoperability services
- adapters and integration services
- ETL procedures and scripts

### **2.10.6. Training Documentation**

Training documentation is a key component for ensuring effective knowledge transfer and the operational readiness of MAFWE personnel involved in the use, administration, and support of the IAIP platform. These materials shall equip users, system administrators, and trainers with the necessary knowledge and guidance to perform their roles efficiently and to ensure the sustainable operation of the system after project completion.

The Supplier shall therefore provide comprehensive training documentation, including but not limited to:

- Administrator Training Materials
- End-User Training Materials
- System Operation Manuals
- Training Completion Reports
- Train-the-Trainer Materials
- Recorded Training Sessions (if applicable)

### **2.10.7. Final Project Deliverables**

Document Title	Description
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Final System Documentation Package	Consolidated set of technical documentation produced during project implementation
Final Data Migration Validation Report	Confirmation of completeness and integrity of migrated data
Sustainability and Exit Plan	Formal document that defines how the system will be maintained and operated after the project ends, including the transfer of responsibilities from the supplier to the client. Immediately before the Final Acceptance Test
Final System Acceptance Report	Formal confirmation of successful IAIP implementation
Knowledge Transfer Completion Report	Confirmation that training and knowledge transfer activities have been completed.  The Knowledge Transfer Completion Report shall be based, among others, on the results of the Training Completion Reports defined in Chapter 2.10.6.
Final Project Implementation Report	Comprehensive report summarizing project implementation

### 2.10.8. Document Review and Approval Procedure

The Supplier shall submit the documents in accordance with the **Implementation Schedule Table** set out in **Chapter 4.2**.

MAFWE shall review the submitted documents within a review period agreed during the project inception phase

MAFWE may approve the document or request clarifications or revisions

The Supplier shall revise and resubmit the document for approval

A document shall be considered approved once written confirmation has been provided by MAFWE. Approval of documents required for phase completion and acceptance shall be a prerequisite for formal acceptance of the corresponding implementation phase.

All deliverables defined in this chapter are reflected in the System Inventory Table (Chapter 4.4) for the purposes of cost estimation and contractual alignment.

## 2.11. Technical Support

### 2.11.1. Technical Support Detailed Requirements

Number	Feature	Type
<b>TSR.01.01</b>	<p>The Supplier must propose detailed technical support arrangements for the IAIP application software, interfaces, and related ICT infrastructure operated by MAFWE, including:</p> <ul style="list-style-type: none"> <li>- Support Arrangements</li> <li>- Warranty and Post-Warranty Support</li> <li>- A specimen Support/Service Level Agreement, which shall form the basis of required support for the IAIP software and related ICT infrastructure following Operational Acceptance</li> <li>- Details of proposed support levels, problem management and escalation procedures, problem prioritization, response times for both remote and on-site support.</li> </ul>	<b>M</b>
<b>TSR.01.02</b>	<p>The service specification for application and system software includes, but is not limited to ensuring defect-free operation of the IAIP, monitoring of operations, troubleshooting, addressing functionality, availability, and performance issues, implementing system change requests, etc. The Supplier shall ensure continuous operability of the IAIP application software and interfaces and perform updates, patches, and upgrades as requested or approved by MAFWE.</p>	<b>M</b>

### 2.11.2. Service Level Classification

Depending on the severity level classification, the Purchaser expects the following level of services to be provided by the Supplier for Technical Support and Maintenance Services:

Severity Level	Description / Indicators	Initial Response – Subsequent Response – Resolve Times
Severity 1 (Critical)	An Incident/Problem has made a Critical function of the IAIP unusable or unavailable and no workaround exists. Typically, multiple users are affected causing a cessation of work within an entire component of the Purchaser, module, or important function of the IAIP.	1 hour – Every 2 hours – 8 hours

Severity Level	Description / Indicators	Initial Response – Subsequent Response – Resolve Times
Severity 2 (High)	An Incident/Problem has made a Critical function of the IAIP unusable or unavailable, but a workaround exists; or an Important function of the IAIP unusable or unavailable, but no workaround exists.	1 hour – Every 4 hours – 24 hours
Severity 3 (Medium)	An Incident/Problem has diminished Critical or Important functionality or performance of the IAIP, but the functionality still performs as specified in the End User documentation.	2 hour – Every 4 hours – 24 hours
Severity 4 (Low)	An Incident/Problem has diminished Supportive IAIP functionality or performance.	4 hours – Daily – 2 business days
Severity 5 (Scheduled)	A Service Request logged by a user (Purchaser’s personnel) which is typically performed via a scheduled appointment. The user will be notified of the status of the Support Ticket, asked for additional information if necessary and informed regarding the required timeframe for completion. Examples include: create/update user account, assign permissions, create/update report, or provide user training.	4 hours – Daily – As agreed between Purchaser and Supplier, but latest within 5 business days.

### 2.11.3. Service Level Monitoring and Reporting

The Supplier shall implement a ticket-based support system for registering, tracking, and resolving all incidents and service requests related to the IAIP platform.

All incidents and service requests shall be recorded in a centralized support log, including the time of registration, severity level, response time, resolution actions, and closure confirmation.

The Supplier shall provide MAFWE with periodic support reports (at least monthly) summarizing the number and type of incidents, response and resolution times, SLA compliance indicators, and outstanding issues.

MAFWE shall have the right to review the support records and request corrective actions if the agreed

### 2.11.4. Post IAIP Implementation Services

The post IAIP implementation services should include:

- a) Helpdesk operations for IAIP
- b) Warranty Maintenance and Support of IAIP application software, interfaces, and related ICT infrastructure components

### 2.11.5. Warranty and Post-Warranty Support Detailed Requirements

Number	Feature	Type
<b>TSR.02.01</b>	All IAIP application software, interfaces, and related ICT services delivered through the contract must be maintained by the Supplier from contract commencement, throughout the warranty period (and during the post-warranty support period, if applicable).	<b>M</b>
<b>TSR.02.02</b>	A maintenance plan must be provided describing the procedures for on-site and off-site maintenance during normal hours of operation, including: <ol style="list-style-type: none"> <li>i. On-site and remote fault diagnostic techniques</li> <li>ii. Mean time to resolve major system issues</li> <li>iii. Issue escalation procedures</li> <li>iv. Maintenance logs and MAFWE official authorizations</li> </ol>	<b>M</b>
<b>TSR.02.03</b>	The Supplier should describe <b>software support facilities</b> (including integration with existing ICT infrastructure at MAFWE) in relation to the following: <ol style="list-style-type: none"> <li>i. Who will be responsible for support and maintenance</li> <li>ii. Staff levels and experience with the proposed software</li> <li>iii. The average time required to resolve different types of issues</li> </ol>	<b>M</b>

### 2.12. Requirements of the Supplier's Technical Team

The Supplier must fulfil the following requirements:

The Supplier must be a legal entity registered with the competent registration authority for performing works related to the subject of procurement with the following qualities:

- i. The Bidder shall have at least five (5) years of proven experience in providing technical services related to IT applications and large information systems for public authorities or private sector entities, with demonstrated successful results.

- ii. The Bidder shall have proven experience in the design and establishment of information systems using modern technologies. This shall include participation in the design and development of at least three (3) large and fully completed information systems for public authorities, preferably including at least one (1) system in the agriculture sector.
- iii. The Bidder shall demonstrate leadership in the successful implementation of at least one (1) project on national or regional level involving large scale data entry and/or data migration and quality control.
- iv. The Bidder shall have experience in the provision of technical services related to the creation, extraction and processing of geospatial data and in the development of GIS based registers or systems. This shall include participation in the design and development of at least two (2) registers, information systems, or system modules.
- v. The Bidder shall have successfully completed either:
  - a) at least one (1) contract with a value of not less than EUR 2,000,000, or
  - b) at least two (2) contracts, each with a value of not less than EUR 1,000,000,for the supply and implementation of an integrated information system that includes hardware and software components, implemented within the last five (5) years.
- vi. The Bidder shall hold valid ISO/IEC 20000, ISO 27001 and ISO 9001 certificates issued by an accredited certification body.

The minimum required annual volume of services shall be at least EUR 1,5 million in at least three (3) of the last five (5) years. Proven experience and positive achievements should be demonstrated by letters or certificates issued by previous Clients.

Any entity that participated in the preparation of this Terms of Reference or related technical documentation shall be disqualified from participating in the procurement procedure, either as a bidder, consortium member, or subcontractor.

The Supplier MUST make available, at minimum, a technical team of the following key experts and support experts during the Supply, Installation, and Integration activities under the Contract:

**Key expert 1: Project Manager – 1 expert**

Minimum requirements:

- University degree in Information Systems, Software Engineering, Electrical Engineering, Geodesy, Geoinformatics, or Economics and Business.
- At least 10 years of work experience in managing projects in the fields of ICT, GIS applications, spatial data management, or public sector information systems.
- Proven experience of successfully acting as a project manager in at least three complex IT-related projects.
- Certified in project management (PMP, PRINCE2, or equivalent).

- Fluency in English.
- Knowledge of Macedonian language is required.

**Key expert 2: System Architect – 1 expert**

Minimum requirements:

- University degree in Information Systems, Software Engineering, or Electrical Engineering.
- At least 5 years of professional experience in design and architecture of complex IT systems.
- Proven experience of successfully acting as system architect in at least three complex IT-related projects.
- Holding an enterprise IT architecture certification (e.g., TOGAF, Zachman, or equivalent).
- Fluency in English.
- Knowledge of Macedonian language is desirable.

**Key expert 3: IT Infrastructure Specialist – 1 expert**

Minimum requirements:

- University degree in Information Systems, Software Engineering, or Electrical Engineering.
- At least 5 years of professional experience in configuration and management of virtualization, data storage, and server environments.
- Proven experience of successfully acting as an IT Infrastructure Specialist in at least three complex IT-related projects.
- Holding a professional certificate for virtualization platform (e.g., VMware Certified Professional, Microsoft Hyper V or equivalent).
- Fluency in English.
- Knowledge of Macedonian language is desirable.

**Key expert 4: Database Administrator (DBA) – 1 expert**

Minimum requirements:

- University degree in Information Systems, Computer Science, or related field.
- At least 3 years of experience in database management and optimization.
- Proven experience of successfully acting as a database administrator in at least three complex IT-related projects.
- Holding certification for Database platform (e.g., Oracle, PostgreSQL, SQL Server, or equivalent).
- Fluency in English.
- Knowledge of Macedonian language is desirable.

**Key expert 5: GIS Database Specialist – 1 expert**

Minimum requirements:

- University degree in Information Systems, Software Engineering, Electrical Engineering, Geodesy or Geoinformatics
- At least 5 years of professional experience in working with GIS database platforms
- Proven experience of successfully acting as a GIS database specialist in at least three complex IT-related projects.
- Holding the valid professional level of certification for the GIS database platform (e.g., Esri, QGIS, or equivalent)
- Fluency in English,
- Knowledge of Macedonian language is desirable.

**Key expert 6: GIS Specialist – 1 expert**

Minimum requirements:

- University degree in Geodesy, Geoinformatics, Information Systems, or related field.
- At least 5 years of professional experience in implementing enterprise GIS systems, mass geospatial data creation and mass attribute data entry.
- Proven experience of successfully acting as a GIS specialist in at least three complex IT-related projects.
- Holding a valid professional certification for GIS platform (e.g., Esri, QGIS, or equivalent).
- Fluency in English.
- Knowledge of Macedonian language is required.

**Key expert 7: Software Developers – 5 experts**

Minimum requirements:

- University degree in Information Systems, Software Engineering, or Electrical Engineering.
- At least 5 years of professional experience in software development, including Web GIS applications and system integration.
- Proven experience of successfully acting as a Software Developer in at least three complex IT-related projects.
- Holding a valid certificate for software development (e.g., Microsoft, Oracle, Java, or equivalent).
- Fluency in English.
- Knowledge of Macedonian language is desirable.

**Key expert 8: Data Warehouse / BI Specialist – 1 expert**

**Minimum requirements:**

- University degree in Information Systems, Computer Science, or related field.
- At least 5 years of experience in data warehouse design, ETL development, and business intelligence reporting.
- Holding a relevant certification for the BI or DW platform (e.g., Microsoft Power BI, Oracle BI, Tableau, or equivalent).
- Fluency in English.
- Knowledge of Macedonian language is desirable.

**Key expert 9: Data Protection Specialist – 1 expert****Minimum requirements:**

- University degree in Information Security, Cyber Security, Computer Science, Information Systems, Law, or Data Science.
- At least 3 years of experience in applying privacy and data protection standards (e.g., GDPR) within IT systems.
- Holding a valid certificate in data privacy or information security (e.g., CIPP/E, ISO 27701 Lead Implementer, or equivalent).
- Fluency in English.
- Knowledge of Macedonian language is desirable.

**Non-Key expert 1: Network Security Specialist – 1 expert****Minimum requirements:**

- University degree in Information Systems, Software Engineering, or Electrical Engineering.
- At least 5 years of professional experience in implementation of network and cybersecurity solutions.
- Holding a professional certificate for the firewall or network security platform (e.g., Fortinet NSE, Cisco CCNP Security, Palo Alto PCNSE, or equivalent).
- Fluency in English.
- Knowledge of Macedonian language is desirable.

**Non-Key expert 2: Land Management Specialist – 1 expert****Minimum requirements:**

- University degree in Land Management / Land Administration, Geodesy, Geoinformatics, Environmental Science / Environmental Management, Agriculture or Law
- At least 5 years of professional experience in land management, preferably in the field of agriculture.
- Fluency in English,

- Knowledge of Macedonian language is required.

### **Non-Key expert 3: Agricultural Economics Specialist – 1 expert**

Minimum requirements:

- University degree in Agricultural Economics, Economics, Statistics, Agricultural Policy, Public Policy, or a related field
- At least 5 years of professional experience in agricultural economics, policy analysis, statistical evaluation, or related fields, preferably with experience in FADN (Farm Accountancy Data Network) or similar farm-level data systems
- Proven experience in data analysis, agricultural statistical reporting, or economic modelling in the agricultural sector
- Fluency in English
- Knowledge of Macedonian language is desirable.

## **D. TESTING AND QUALITY ASSURANCE REQUIREMENTS**

### **3.1. Inspections**

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#### **Factory Inspections (if applicable):**

In case ICT or network equipment is supplied under this contract, the Manufacturer shall perform Quality Assurance / Quality Control (QA/QC) prior to dispatch, in accordance with established internal QC procedures for each component.

#### **Inspections following delivery of equipment (if applicable):**

Upon delivery to MAFWE, the Purchaser's designated acceptance committee shall verify:

- delivered quantities against the purchase order,
- physical condition (no visible damage or defects),
- completeness of accessories and components (e.g., networking and electrical connections, rack components, if applicable).

Following successful verification, a formal **Equipment Acceptance Certificate** will be issued.

#### **Software Acceptance:**

All software developed, configured, or delivered under this contract shall be subject to formal acceptance testing. Acceptance shall be based on:

- successful completion of agreed **System Acceptance Testing (SAT)**,
- successful completion of **User Acceptance Testing (UAT)** with MAFWE end-users,
- verification that all contractual functional and general requirements are met,
- confirmation that system documentation has been delivered in accordance with Section 2.10.

Upon satisfactory completion of acceptance testing, the Purchaser shall issue a Software Acceptance Certificate.

### 3.2. Pre-commissioning Tests (if applicable)

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In addition to the Supplier's standard check-out and set-up tests, the Supplier (with the assistance of the Purchaser) must perform the following tests on the supplied equipment, the System and its Subsystems before Installation will be deemed to have occurred and the Purchaser will issue the corresponding Installation Certificate(s) (pursuant to GCC Clause 26 and related SCC clauses).

This section applies only in case ICT infrastructure components (servers, network, or storage equipment) are supplied under the contract.

### 3.3. Operational Acceptance Tests

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The Operational Acceptance Tests (OAT) (and any necessary repeats) shall be the primary responsibility of the Purchaser, but will be conducted with the full cooperation of the Supplier. Their purpose is to confirm that the System (or major components or Subsystems) conforms to the Technical Requirements and meets the performance standards defined in the Supplier's bid, including (but not limited to) functional and technical performance criteria.

Operational Acceptance Testing will be conducted as specified in the Finalized Project Plan. Operational Acceptance Tests shall also cover the performance and data integrity of the BI platform and Data Warehouse, ensuring correct synchronization with IAIP registries.

- **Software Acceptance:** Acceptance testing of the IAIP application software and SALMIS shall commence within one (1) week of the Supplier's written certification that the system is ready for acceptance testing. Both parties shall make reasonable efforts to promptly complete testing in accordance with the agreed Acceptance Test Plan.
- **Hardware Acceptance:** Hardware operational acceptance shall follow successful completion of pre-commissioning and installation tests, and will be verified as part of the OAT process.

If any software or hardware component fails to meet the acceptance criteria or does not pass the Purchaser's acceptance tests, the Purchaser may reject the component. The Supplier shall, at no additional cost to the Purchaser, either replace the rejected component or make the necessary alterations to bring it into conformity with the specifications.

Within one (1) week following the conclusion of the acceptance tests, the IAIP Project Manager shall inform the Supplier's Representative of the outcome, listing any deficiencies to be corrected. The Supplier will be required to make all reasonable and necessary efforts to promptly correct the listed defects, after which the relevant tests will be repeated until conformity is achieved.

### 3.4. Warranty Defect Repair

The Supplier must provide a comprehensive warranty for all products and services included in their proposal. This warranty shall cover:

- all software developed, customized, or configured under this contract,
- any hardware delivered under this contract (if applicable),
- all third-party components and licenses included in the Supplier's proposal,
- related services, including integration, configuration, and data migration.

The Warranty Period shall commence from the date of final Operational Acceptance of the complete, working IAIP and shall extend for the duration indicated in the contract. Warranty and post-warranty costs shall be included in the contract price.

The warranty and maintenance support for application software shall include minor changes identified during the operations and maintenance phase. These shall include, but not be limited to:

- adjustments to the user interface and form layouts,
- modifications of report layouts,
- minor configuration adjustments needed to ensure compliance with evolving operational requirements.

For major software changes required during the contract period as a result of changes to acts, regulations, guidelines, or procedures, MAFWE shall submit a formal Change Request to the Supplier. Such changes shall be addressed under the change management procedures defined in the contract.

### Testing and Quality Assurance Detailed Requirements

Number	Feature	Type
TQA.01.01	Inspection of the installed <b>IAIP software</b> (and other components, if applicable) will occur at the Purchaser's site.	M

Number	Feature	Type
<b>TQA.01.02</b>	The Bidder must test all IAIP modules, interfaces (including interoperability services), BI platform components, and – if supplied – ICT infrastructure before and after installation.	<b>M</b>
<b>TQA.01.03</b>	A comprehensive Test Plan for Testing and Quality Assurance must be provided after acceptance of the business analysis and installation of software, and must be approved by the Purchaser prior to the start of testing.	<b>M</b>
<b>TQA.01.04</b>	The Test Plan must specify the types of testing that will be conducted (e.g., functional testing, load testing, stress testing, performance testing, security testing, user acceptance testing).	<b>M</b>
<b>TQA.01.05</b>	The Bidder must describe the methodology for system testing, installation, error logging, and correction. Test cases must be delivered to the Purchaser for approval at least two (2) weeks before testing begins.	<b>M</b>
<b>TQA.01.06</b>	To determine whether the System and Subsystems meet all requirements, at least 90% of the tests included in the Test Plan must be completed successfully. The Purchaser retains the right to reject test results if any core processes fail.	<b>M</b>
<b>TQA.01.07</b>	The Bidder must correct any software or system errors detected in the course of testing and re-test as necessary.	<b>M</b>
<b>TQA.01.08</b>	The Bidder must provide reports of test results in accordance with the approved Test Plan.	<b>M</b>
<b>TQA.01.09</b>	The Bidder must prepare an Acceptance Testing Plan, aligned with the milestones defined in the overall Project Plan, and acceptable to the Purchaser.	<b>M</b>
<b>TQA.01.10</b>	The IAIP modules must be tested to ensure that the system as a whole functions as specified in the requirements.	<b>M</b>
<b>TQA.01.11</b>	The Bidder must correct any system errors detected during testing and re-test as necessary. Re-testing shall not be limited to the unit affected but shall include regression testing of the entire application system.	<b>M</b>
<b>TQA.01.12</b>	The System must be thoroughly tested with production-volume workloads in a production-like environment to validate performance in terms of throughput, response time, runtime, and resource utilization.	<b>M</b>

## E. IMPLEMENTATION SCHEDULE

### 4.1. Phased Implementation Strategy

The Integrated Agricultural Information Platform (IAIP) represents a complex, multi-layered information system composed of interdependent registries, spatial components, analytical services, and interoperability mechanisms.

Due to the architectural dependencies between modules and the operational importance of several key agricultural information systems, the IAIP shall be implemented through a structured phased implementation strategy.

The phased approach ensures controlled deployment of system components, preservation of operational continuity for critical systems, structured validation of newly implemented functionality, and transparent contractual and financial execution of the project.

The implementation framework is therefore organized into a series of **contractually defined implementation phases**, each representing a logical grouping of system components and implementation activities.

The phases described in this chapter represent the primary implementation structure of the IAIP project, while the detailed sequencing and duration of activities shall be defined in the **Implementation Schedule Table**.

#### 4.1.1. General Principles of Phased Implementation

The phased implementation model is established in order to ensure:

- uninterrupted continuity of critical agricultural information systems and administrative processes
- gradual stabilization of the IAIP system architecture
- controlled migration and validation of legacy and temporary datasets
- structured contractual acceptance and milestone-based payments
- mitigation of technical and operational risks during system deployment

Each implementation phase shall be considered a **functional and contractual milestone** within the project implementation framework.

Although the implementation is structured in phases, certain activities belonging to different phases may be executed in parallel where technically feasible. The sequencing of activities has been designed in a manner that avoids logical conflicts and ensures that no activity is required to be completed before the prerequisite components on which it depends have been delivered.

While activities from different phases may run concurrently, the formal acceptance of each phase shall occur only after all deliverables associated with that phase have been successfully completed and validated. The required deliverables and documentation supporting phase completion and acceptance are specified in **Chapter 2.9 – Project Documents Requirements**.

#### Phase Overview

Phase	Title	Main Objective
Phase 1	Infrastructure Deployment	Delivery and installation of hardware, software licenses and infrastructure

Phase 2	Redesign and migration of the primary registers (Farm Register and LPIS)	Modernization and deployment of the two primary agricultural registers
Phase 3	Introduction of SALMIS	Implementation of the State-owned Agricultural Land Management System
Phase 4	Legacy Systems Modernization	Modernization of remaining MAFWE legacy systems
Phase 5	Introduction of New Registries and Domain-specific datasets	Development of additional registries defined in Annex B
Phase 6	Introduction of BI Platform	Establishment of the analytical data warehouse and BI services
Phase 7	Interoperability Enablement and Service Publication	Activation of interoperability services through NIP

#### 4.1.2. Phase 1 – Infrastructure Deployment

Phase 1 establishes the technical infrastructure required for the implementation of the IAIP platform.

Activities include:

- delivery and configuration of firewall devices (specified in Chapter 2.3.1)
- delivery and configuration of server hardware (specified in Chapter 2.3.2)
- delivery and installation of required software and licenses for GIS server/desktop (specified in Chapter 2.4.2.1 and 2.4.2.2)
- delivery and installation of required software and licenses for RDBMS (specified in Chapter 2.4.1)
- configuration of network and security components required for IAIP deployment
- installation and configuration of server infrastructure according to the architecture proposed by the Supplier
- installation and configuration of database services
- deployment of the GIS Server Platform and GIS Support Module
- establishment of development and testing environments

Completion of Phase 1 shall be confirmed through a **Phase 1 Acceptance Report**, supported by the relevant deliverables and documentation specified in **Chapter 2.9 – Project Documents Requirements**.

#### 4.1.3. Phase 2 – Redesign and Migration of the Primary Agricultural Registers (Farm Register and LPIS)

Phase 2 includes redesign, migration and deployment of the Farm Register (FR) and the Land Parcel Identification System (LPIS).

- Farm Register (FR) - Implementation according to Chapter 2.5.1.2.2.1, including redesign, migration of legacy data, deployment, and decommissioning of the legacy implementation.
- Land Parcel Identification System (LPIS) - Implementation according to Chapter 2.5.1.2.2.2, including migration of spatial and alphanumeric data, deployment and legacy system decommissioning.

Operational continuity must be ensured during transition except during approved maintenance windows.

Completion of Phase 2 shall be confirmed through a **Phase 2 Acceptance Report**, supported by the relevant deliverables and documentation specified in **Chapter 2.9 – Project Documents Requirements**.

#### **4.1.4. Phase 3 – Introduction of SALMIS**

Phase 3 includes implementation of the **State-owned Agricultural Land Management System (SALMIS)** in accordance with **Chapter 2.5.1.2.3**.

Activities include:

- implementation of the SALMIS module
- establishment of a geospatial layer
- migration of data from temporary inventory and geodetic elaborates applications
- execution of data quality controls and required corrections
- integration interoperability with the Farm Register and LPIS

Completion of Phase 3 shall be confirmed through a **Phase 3 Acceptance Report**, supported by the relevant deliverables and documentation specified in **Chapter 2.9 – Project Documents Requirements**.

#### **4.1.5. Phase 4 – Legacy Systems Modernization**

Phase 4 covers redesign and migration of additional legacy systems specified in **Chapter 2.5.1.2.2.3 – 2.5.1.2.2.7**, including:

- Monitoring Software for Agricultural Cooperatives
- Information System for Evidence of Tobacco (ISET)
- Agricultural Products Buyers
- Organic Production Information System
- Agricultural Market Information System (AMIS)

Formal decommissioning of legacy systems requires **written approval by MAFWE**.

Completion of Phase 4 shall be confirmed through a **Phase 4 Acceptance Report**, supported by the relevant deliverables and documentation specified in **Chapter 2.9 – Project Documents Requirements**.

#### **4.1.6. Phase 5 – Introduction of New Registries and Domain-specific datasets**

Phase 5 includes implementation of newly established registries and domain-specific datasets defined in **Annex B of this Technical Specification (Annex B- Agriculture Registries MAFWE)**

These components include:

- alphanumeric registries
- spatially enabled registries
- sector-specific datasets supporting agricultural policy monitoring
- analytical datasets supporting sector analysis

The registries introduced in this phase shall rely on the stabilized reference datasets established in **Phases 2 and 3**.

Completion of Phase 5 shall be confirmed through a **Phase 5 Acceptance Report**, supported by the relevant deliverables and documentation specified in **Chapter 2.10 – Project Documents Requirements**.

#### **4.1.7. Phase 6 – Introduction of the BI Platform**

Phase 6 includes establishment of the analytical environment according to **Chapter 2.7**.

Activities include:

- delivery of BI licenses
- installation and configuration of BI software
- establishment of the Data Warehouse
- customization and configuration of BI analytical components

The BI platform shall progressively ingest and analyze datasets generated by IAIP operational modules implemented in **Phases 2–5**.

Completion of Phase 6 shall be confirmed through a **Phase 6 Acceptance Report**, supported by the relevant deliverables and documentation specified in **Chapter 2.10 – Project Documents Requirements**.

#### **4.1.8. Phase 7 – Interoperability Enablement and Service Publication**

Phase 7 covers activation of interoperability services in accordance with **Chapter 2.5.4 – Interoperability and Services**.

Activities include:

- development and publication of outbound APIs through the National Interoperability Platform (NIP)
- exposure of INSPIRE-compliant spatial services (view, download, transformation)
- activation of secure data exchange services with external institutions
- configuration of digital signing, encryption and audit logging mechanisms
- publication of OpenAPI documentation and service descriptions
- establishment of API versioning and monitoring mechanisms

Completion of Phase 7 shall be confirmed through a **Phase 7 Acceptance Report**, supported by the relevant deliverables and documentation specified in **Chapter 2.10 – Project Documents Requirements**.

#### **4.1.9. Institutional Coordination and Activation**

The Supplier shall:

- ensure full technical readiness of IAIP-side services
- support integration testing with external institutions
- provide technical documentation and sandbox environments

The Supplier and the MAFWE contract management team shall ensure that all coordination, testing, and activities related to interoperability with external institutions are performed in a timely manner and in advance of planned deployment milestones.

All such activities, including coordination efforts, technical exchanges, testing steps, and outcomes (whether successful or unsuccessful), shall be formally documented, including through meeting minutes, progress records, and issue logs.

The activation of live bidirectional interoperability services may depend on the technical readiness and institutional coordination of external institutions connected through the National Interoperability Platform.

Delays caused by third-party institutional readiness shall not automatically constitute non-performance of contractual obligations, provided IAIP-side implementation has been completed.

#### **4.1.10. Financial Structuring and Milestone-Based Payments**

To ensure transparency and contractual fairness:

- each implementation phase shall correspond to a milestone in the Implementation Schedule Table
- system components shall be itemized within the System Inventory Tables (Supply and Installation Cost Items) and (Recurrent Cost Items)

Financial acceptance and payments shall be linked to successful delivery and formal acceptance of phases and components.

Partial delays in non-critical components shall not automatically prevent payment for successfully completed and accepted components, provided contractual obligations have been fulfilled.

The implementation of the IAIP platform, including SALMIS, is structured into clearly defined phases, each subject to formal acceptance and linked to milestone-based payments.

Each implementation phase shall be considered complete only upon:

- delivery of agreed functional and technical outputs;
- successful completion of testing activities in accordance with Section D (Testing and Quality Assurance Requirements);
- submission of required deliverables as defined in Section 2.10 (Project Documents Requirements);
- formal acceptance by MAFWE.

The deliverables required for phase completion shall be defined in accordance with Section 2.10.3 (Phase Completion Deliverables) and shall include, inter alia, system components, technical documentation, test reports, and validation results.

Acceptance of each phase shall be performed by MAFWE based on the review of submitted deliverables, testing results, and verification of compliance with the defined functional and technical requirements.

MAFWE may perform validation activities, including testing and review of outputs, and may request clarifications, corrections, or additional evidence prior to granting formal acceptance.

Payments to the Supplier shall be strictly linked to the successful completion and formal acceptance of each implementation phase. No payment associated with a given phase shall be made prior to its formal acceptance by MAFWE.

In the event that a phase does not meet the defined acceptance criteria, the Supplier shall address identified deficiencies and resubmit the relevant deliverables for review and acceptance. Payments related to such phase shall be withheld until the acceptance conditions are fulfilled.

An indicative structure of milestone-based payments is provided below and should serve as guidance for Suppliers when preparing their financial offers.

<b>Phase / Milestone</b>	<b>Key Deliverables</b>	<b>Acceptance Basis</b>	<b>Indicative Payment</b>
Inception Phase (advance payment)	Advance Payment Security submission	Advance Payment Security is duly received and reviewed by the Purchaser.	As per Section IX – Special Conditions of Contract, Chapter C – Payment (GCC 12.1), Paragraph (a) Advance Payment, of the Tender Documentation.
Phase 1 - Infrastructure Deployment	<ul style="list-style-type: none"> <li>• Delivery of Information Technologies, Materials, and other Goods;</li> <li>• Installation and configuration;</li> <li>• Deployment into production and commissioning</li> </ul>	<ul style="list-style-type: none"> <li>• Acceptance Test for Phase 1</li> <li>• Operational Acceptance</li> </ul>	As per Section IX – Special Conditions of Contract, Chapter C – Payment (GCC 12.1), Paragraph (b) Information Technologies, Materials, and other Goods, with the exception of Custom Software and Custom Materials (exclusive of all Warranty, Maintenance and Support Service costs), of the Tender Documentation.
Phase 2 - Redesign and migration of the primary registers (Farm Register and LPIS)	<ul style="list-style-type: none"> <li>• Software module delivery</li> <li>• Interoperability with other systems</li> <li>• Deployment into production and commissioning</li> </ul>	<ul style="list-style-type: none"> <li>• Acceptance Test for Phase 2 (Software module acceptance)</li> <li>• Interoperability Acceptance Test</li> <li>• Operational Acceptance</li> </ul>	As per Section IX – Special Conditions of Contract, Chapter C – Payment (GCC 12.1), Paragraph (c) Custom Software and Custom Materials (exclusive of all Warranty, Maintenance and Support Service costs), of the Tender Documentation.
Phase 3 - Introduction of SALMIS	<ul style="list-style-type: none"> <li>• Software module delivery</li> <li>• Interoperability with other systems</li> <li>• Deployment into production and commissioning</li> </ul>	<ul style="list-style-type: none"> <li>• Acceptance Test for Phase 3 (Software module acceptance)</li> <li>• Interoperability Acceptance Test</li> <li>• Operational Acceptance</li> </ul>	As per Section IX – Special Conditions of Contract, Chapter C – Payment (GCC 12.1), Paragraph (c) Custom Software and Custom Materials (exclusive of all Warranty, Maintenance and Support Service costs), of the Tender Documentation.
Phase 4 - Legacy Systems Modernization	<ul style="list-style-type: none"> <li>• Software modules delivery</li> <li>• Interoperability with other systems</li> <li>• Deployment into production and commissioning</li> </ul>	<ul style="list-style-type: none"> <li>• Acceptance Test for Phase 4 (Software modules acceptance)</li> <li>• Interoperability Acceptance Test</li> <li>• Operational Acceptance</li> </ul>	As per Section IX – Special Conditions of Contract, Chapter C – Payment (GCC 12.1), Paragraph (c) Custom Software and Custom Materials (exclusive of all Warranty, Maintenance and Support Service costs), of the Tender Documentation.
Phase 5 - Introduction of New Registries and Domain-specific datasets	<ul style="list-style-type: none"> <li>• Delivery of new registries</li> <li>• Interoperability with other systems</li> </ul>	<ul style="list-style-type: none"> <li>• Acceptance Test for Phase 5 (Acceptance of new registries)</li> <li>• Interoperability Acceptance Test</li> <li>• Operational Acceptance</li> </ul>	As per Section IX – Special Conditions of Contract, Chapter C – Payment (GCC 12.1), Paragraph (c) Custom Software and Custom Materials (exclusive of all

	<ul style="list-style-type: none"> <li>• Deployment into production and commissioning</li> </ul>		Warranty, Maintenance and Support Service costs), of the Tender Documentation.
Phase 6 - Introduction of BI Platform	<ul style="list-style-type: none"> <li>• Completion and acceptance of the corresponding services</li> <li>• Operational acceptance</li> </ul>	<ul style="list-style-type: none"> <li>• Acceptance Test for Phase 6 (Software modules acceptance)</li> <li>• Interoperability Acceptance Test</li> <li>• Operational Acceptance</li> </ul>	As per Section IX – Special Conditions of Contract, Chapter C – Payment (GCC 12.1), Paragraph (d) Services other than Training (exclusive of all Warranty, Maintenance and Support Service costs), of the Tender Documentation.
Phase 7 - Interoperability Enablement and Service Publication	<ul style="list-style-type: none"> <li>• Completion and acceptance of the corresponding services</li> <li>• Operational acceptance</li> </ul>	<ul style="list-style-type: none"> <li>• Acceptance Test for Phase 7 (Interoperability Acceptance Test)</li> <li>• Operational Acceptance</li> </ul>	As per Section IX – Special Conditions of Contract, Chapter C – Payment (GCC 12.1), Paragraph (d) Services other than Training (exclusive of all Warranty, Maintenance and Support Service costs), of the Tender Documentation.
Training and Training materials	Completion of the training program in accordance with the approved Training Plan	<ul style="list-style-type: none"> <li>• Training Plan submission</li> <li>• Training Completion Report and evaluation Delivery</li> <li>• Delivery of Training materials and documentation</li> </ul>	As per Section IX – Special Conditions of Contract, Chapter C – Payment (GCC 12.1), Paragraph (e) Training, of the Tender Documentation.
Operational Acceptance of the System	Full system deployment and end-to-end validation	Operational Acceptance of the System by MAFWE	
Warranty, Maintenance and Support Services	Warranty, maintenance and support services performed during the warranty period	Services Completion Report (periodically)	

The exact allocation of financial percentages across milestones is defined in Section 9 – SCC, Chapter C (Payment GCC 12.1)"

## 4.2. Implementation Schedule Table

System, Subsystem, or lot number: **entire System procurement**

All documentation deliverables required under the IAIP project are defined in Chapter 2.10 – Project Documents Requirements and shall be submitted in accordance with the Implementation Schedule Table.

The Supplier shall ensure that all documentation deliverables are prepared, submitted, reviewed and approved in alignment with the corresponding implementation phases and milestones.

Line Item No.	Subsystem / Item	Configuration Table No.	Site / Site Code	Delivery (Bidder to specify in the Preliminary Project Plan)	Installation (weeks from Effective Date)	Acceptance (weeks from Effective Date)	Liquidated Damages Milestone
0	Preparation Phase		HQ				
0.1	Project Inception Report	2.10.1	“		3	3	
0.2	Institutional Readiness Review Report	2.10.1	“		4	4	
0.3	Project Plan	2.10.1	“		6	6	
0.4	Project Governance and Communication Plan	2.10.1	“		7	7	
1	Phase 1 – Infrastructure Deployment	2.3	HQ				
1.1	Technical Planning and Quality Assurance - Phase 1 (preparation and submission of documents)	2.10.2	“		7	11	

Line Item No.	Subsystem / Item	Configuration Table No.	Site / Site Code	Delivery (Bidder to specify in the Preliminary Project Plan)	Installation (weeks from Effective Date)	Acceptance (weeks from Effective Date)	Liquidated Damages Milestone
1.2	Firewall Equipment (delivery and installation)	2.3.1	“		8	12	
1.3	Server Equipment (delivery and installation)	2.3.2	“		8	12	
1.4	Database Server (RDBMS) and Licenses (delivery and installation)	2.4.1	“		9	13	
1.5	GIS Server Platform and Licenses (delivery and installation)	2.4.2.1	“		9	13	
1.6	GIS Desktop Software and Licenses (delivery and installation)	2.4.2.2	“		9	13	
1.7	Technical Documentation and System Manuals	2.10.4	“		12	13	
1.8	Source Code and Development Artifacts	2.10.5	“		12	13	
1.9	Acceptance Report - Phase 1	2.10.3	“		13	14	
2	Phase 2 – Redesign and Migration of the Primary Agricultural Registers (Farm Register and LPIS)	2.5.1.2.2	HQ				
2.1	Technical Planning and Quality Assurance - Phase 2 (preparation and submission of documents)	2.10.2	“		26	28	
2.2	Redesign of the Farm Register and data migration	2.5.1.2.2.1	“		28	36	

Line Item No.	Subsystem / Item	Configuration Table No.	Site / Site Code	Delivery (Bidder to specify in the Preliminary Project Plan)	Installation (weeks from Effective Date)	Acceptance (weeks from Effective Date)	Liquidated Damages Milestone
2.3	Redesign of the LPIS and data migration	2.5.1.2.2.2	“		28	36	
2.4	Technical Documentation and System Manuals	2.10.4	“		35	36	
2.5	Source Code and Development Artifacts	2.10.5	“		35	36	
2.6	Acceptance Report - Phase 2	2.10.3	“		36	38	
3	Phase 3 – Introduction of the SALMIS	2.5.1.2.3	HQ				
3.1	Technical Planning and Quality Assurance - Phase 3 (preparation and submission of documents)	2.10.2	“		26	30	
3.2	Implementation of SALMIS and data migration from temporary inventory	2.5.1.2.3	“		28	36	
3.3	Technical Documentation and System Manuals	2.10.4	“		35	36	
3.4	Source Code and Development Artifacts	2.10.5	“		35	36	
3.5	Acceptance Report - Phase 3	2.10.3	“		36	39	
4	Phase 4 – Legacy Systems Modernization	2.5.1.2.2	HQ				

Line Item No.	Subsystem / Item	Configuration Table No.	Site / Site Code	Delivery (Bidder to specify in the Preliminary Project Plan)	Installation (weeks from Effective Date)	Acceptance (weeks from Effective Date)	Liquidated Damages Milestone
4.1	Technical Planning and Quality Assurance - Phase 4 (preparation and submission of documents)	2.10.2	“		37	41	
4.2	Redesign and modernization of: <ul style="list-style-type: none"> <li>Monitoring Software for Agricultural Cooperatives;</li> <li>Information System for Evidence of Tobacco (ISET);</li> <li>Agricultural Products Buyers;</li> <li>Organic Farming Information System</li> <li>Agricultural Market Information System (AMIS).</li> </ul>	2.5.1.2.2.3 - 2.5.1.2.2.7	“		39	43	
4.3	Technical Documentation and System Manuals	2.10.4	“		42	43	
4.4	Source Code and Development Artifacts	2.10.5	“		42	43	
4.5	Acceptance Report - Phase 4	2.10.3	“		43	45	
5	Phase 5 – Introduction of New Registries and Domain-Specific Datasets	2.5.1.2.4	HQ				
5.1	Technical Planning and Quality Assurance - Phase 5 (preparation and submission of documents)	2.10.2	“		43	47	

Line Item No.	Subsystem / Item	Configuration Table No.	Site / Site Code	Delivery (Bidder to specify in the Preliminary Project Plan)	Installation (weeks from Effective Date)	Acceptance (weeks from Effective Date)	Liquidated Damages Milestone
5.2	Implementation of newly established registries and domain-specific datasets defined in Annex B	2.5.1.2.4	“		45	49	
5.3	Technical Documentation and System Manuals	2.10.4	“		48	49	
5.4	Source Code and Development Artifacts	2.10.5	“		48	49	
5.5	Acceptance Report - Phase 5	2.10.3	“		49	51	
6	Phase 6 – Introduction of the BI Platform	2.6	HQ				
6.1	Technical Planning and Quality Assurance - Phase 6 (preparation and submission of documents)	2.10.2	“		29	33	
6.2	BI Software installation and Licensing (delivery and installation)	2.6.1 – 2.6.3 2.7.4	“		29	33	
6.3	BI Implementation and Customization	2.6.4 2.7.1 – 2.7.3	“		51	53	
6.4	Technical Documentation and System Manuals	2.10.4	“		52	53	
6.5	Source Code and Development Artifacts	2.10.5	“		52	53	

Line Item No.	Subsystem / Item	Configuration Table No.	Site / Site Code	Delivery (Bidder to specify in the Preliminary Project Plan)	Installation (weeks from Effective Date)	Acceptance (weeks from Effective Date)	Liquidated Damages Milestone
6.6	Acceptance Report - Phase 6	2.10.3	“		53	55	
7	Phase 7 – Interoperability Enablement and Service Publication	2.5.4	HQ				
7.1	Technical Planning and Quality Assurance - Phase 7 (preparation and submission of documents)	2.10.2	“		45	49	
7.2	IAIP Service Publication	2.5.4.1 – 2.5.4.2	“		47	53	
7.3	Institutional Coordination and Activation	4.1.9	“		47	53	
7.4	Technical Documentation and System Manuals	2.10.4	“		52	53	
7.5	Source Code and Development Artifacts	2.10.5	“		52	53	
7.6	Acceptance Report - Phase 7	2.10.3	“		53	56	
8	Training and Training Materials	2.8	HQ				
8.1	Training and Training Materials for Phase 1 – Infrastructure Deployment	2.8	“		52	56	

Line Item No.	Subsystem / Item	Configuration Table No.	Site / Site Code	Delivery (Bidder to specify in the Preliminary Project Plan)	Installation (weeks from Effective Date)	Acceptance (weeks from Effective Date)	Liquidated Damages Milestone
8.2	Training and Training Materials for Phase 2 – Redesign and Migration of the Primary Agricultural Registers (Farm Register and LPIS)	2.8	“		52	56	
8.3	Training and Training Materials for Phase 3 – Introduction of the SALMIS	2.8	“		52	56	
8.4	Training and Training Materials for Phase 4 – Legacy Systems Modernization	2.8	“		52	56	
8.5	Training and Training Materials for Phase 5 – Introduction of New Registries and Domain-Specific Datasets	2.8	“		52	56	
8.6	Training and Training Materials for Phase 6 – Introduction of the BI Platform	2.8	“		52	56	
8.7	Training and Training Materials for Phase 7 – Interoperability Enablement and Service Publication	2.8	“		52	56	
9	Project Closure		HQ				
9.1	Knowledge Transfer Completion Report	2.10.7	“		52	56	
9.2	Final System Documentation Package	2.10.7	“		52	56	
9.3	Final Data Migration Validation Report	2.10.7	“		52	56	
9.4	Final System Acceptance Report	2.10.7	“		52	56	

Line Item No.	Subsystem / Item	Configuration Table No.	Site / Site Code	Delivery (Bidder to specify in the Preliminary Project Plan)	Installation (weeks from Effective Date)	Acceptance (weeks from Effective Date)	Liquidated Damages Milestone
9.5	Final Project Implementation Report	2.10.7	“		52	56	
9.6	Documentation of Platform Dependencies	2.9.3	“		52	56	
10	Technical Support	2.11	HQ		65	169	
11	Sustainability and Exit Plan	2.9.2.3	HQ		165	169	

**Note:** Refer to the System Inventory Table(s) below for the specific items and components that constitute the Subsystems or item. Refer to the Site Table(s) below for details regarding the site and the site code.

- - indicates not applicable. “ indicates repetition of table entry above.

### 4.3. Implementation Timeline and Transition Risk Management

The implementation of the IAIP shall be aligned with the overall implementation timeline of the Agriculture Modernization Project (AMP), which has a closing date of 31 December 2027. Given the complexity of the IAIP platform and the procedural timelines associated with procurement, contracting, and system implementation, careful planning of implementation activities is required to ensure that the core operational components of the platform are delivered within the available project timeframe.

This section complements the implementation phases defined in the Implementation Schedule Table and does not modify the functional scope of the IAIP modules described in this Technical Specification.

The phased implementation model of the IAIP platform, including the sequencing of modules, registries, and system components, is defined in the Implementation Schedule Table of this Technical Specification. The phases described in that schedule provide the framework for the progressive development, deployment, testing, and operational stabilization of the platform.

During the inception phase of the project, the Supplier shall prepare a detailed implementation plan that further elaborates the sequencing of technical activities, milestones, and deliverables within the framework defined by the Implementation Schedule Table. This plan shall include an indicative timeline for the completion of the major implementation phases and shall be submitted to MAFWE for review and approval prior to the commencement of the main development activities.

In order to ensure a realistic and consistent implementation approach, indicative durations are defined for each implementation phase. These durations provide a reference framework for bidders and shall be taken into account when preparing the detailed implementation schedule.

Bidders shall propose a detailed and justified implementation timeline aligned with the phase structure defined in this Technical Specification, taking into consideration the indicative durations and the overall project completion deadline.

Phase	Description	Indicative Duration
Phase 1	Infrastructure Deployment	1.5 months
Phase 2	Redesign and migration of the primary registers (Farm Register and LPIS)	2.5 months
Phase 3	Introduction of SALMIS	2.5 months
Phase 4	Legacy Systems Modernization	1.5 months
Phase 5	Introduction of New Registries and Domain-specific datasets	1.5 months
Phase 6	Introduction of BI Platform	2.5 months (with discontinuity)
Phase 7	Interoperability Enablement and Service Publication	2 months (with discontinuity)

The proposed implementation schedule shall clearly identify critical phases, dependencies, and sequencing constraints, including components required for minimum viable operation of the IAIP platform prior to the AMP closing date.

Note: The phase structure described in Section 4.1 shall be aligned with the indicative durations defined in this Section, while allowing bidders to optimize sequencing and overlap of activities where justified.

#### **4.3.1. Delivery Prioritization within the AMP Timeline**

Given the scale and scope of the IAIP platform, the implementation approach prioritizes the delivery of core operational components required for the functioning of key agricultural administration processes.

Particular priority shall be given to the implementation and stabilization of the following components:

- Modernization and deployment of the Farm Registry (FR);
- Modernization and deployment of the Land Parcel Identification System (LPIS);
- Implementation of the core modules of the State-Owned Agriculture Land Management Information System (SALMIS);
- Establishment of the central IAIP platform services and data integration layer;
- Deployment of the Business Intelligence and analytical data environment required for monitoring, reporting, and policy analysis.

For the purposes of ensuring operational readiness within the Project timeline, a set of minimum viable components shall be defined as mandatory deliverables to be completed prior to the AMP closing date.

These components shall include, at a minimum:

- The core IAIP platform;
- Farm Register (FR);
- Land Parcel Identification System (LPIS);
- State-Owned Agriculture Land Management Information System (SALMIS)

These components shall be fully deployed, tested, and formally accepted by MAFWE prior to the AMP closing date and shall constitute the minimum viable delivery of the Project.

Other components, including additional registers, advanced BI functionalities, and extended interoperability integrations, may be implemented progressively within the implementation period or in subsequent phases, as defined in the implementation schedule.

#### **4.3.2. Transition Management for Mission-Critical Systems**

The transition from legacy systems to the IAIP platform shall be carefully managed to ensure uninterrupted operation of mission-critical agricultural administration functions.

In particular, systems supporting the Farm Registry (FR) and the Land Parcel Identification System (LPIS) are essential for agricultural payments administration and must remain operational throughout the transition period, including during agricultural payment cycles and subsidy administration processes.

To ensure operational continuity, the Supplier shall implement a controlled transition approach, which may include:

- Temporary parallel operation of legacy systems and IAIP modules during the stabilization period;
- Verification of functional outputs and data consistency between the legacy and IAIP environments;
- Structured migration and transition procedures agreed with MAFWE prior to the decommissioning of legacy systems.

Legacy systems shall only be decommissioned after the corresponding IAIP modules have been successfully deployed, tested, and accepted, and after a stabilization period agreed with the Purchaser.

During the transition from legacy systems to the IAIP platform, legacy systems shall remain operational until the corresponding IAIP modules are successfully deployed, tested, and formally accepted.

In the event that deployed IAIP modules fail to meet agreed functional, performance, or data quality requirements during testing or early operational use, MAFWE may require the temporary continuation or reactivation of legacy system operations for the affected functionalities.

Such conditions shall include, but are not limited to:

- Critical functional failures preventing execution of core business processes;
- Significant data inconsistencies or loss affecting operational reliability;
- System performance issues preventing effective use by end users.

The Supplier shall support such fallback arrangements and shall take corrective actions to address identified issues prior to re-attempting deployment and acceptance.

### **4.3.3. Implementation Schedule Governance**

The Implementation Schedule Table included in this Technical Specification defines the expected sequencing of implementation phases, major deliverables, and project milestones.

During the inception phase, the Supplier shall refine the detailed implementation schedule in consultation with MAFWE to ensure alignment with:

- The operational requirements of agricultural administration processes;
- Institutional coordination requirements with external systems and stakeholders;
- And the overall timeline of the Agriculture Modernization Project (AMP).

Any refinements to the implementation schedule shall remain consistent with the objective of ensuring the timely delivery of the core IAIP operational capabilities within the AMP implementation period.

### **4.3.4. Reporting, Review and Acceptance of Deliverables**

For each contractual deliverable under the IAIP project, the Supplier shall submit the deliverable to the MAFWE in accordance with the agreed Implementation Schedule.

Upon submission of each deliverable, the MAFWE shall review the submitted material and provide written feedback, which may include approval, conditional approval, or a request for revision, within the review period defined in the Implementation Schedule.

In cases where revisions are requested, the Supplier shall address the MAFWE comments and resubmit the revised deliverable within the timelines specified in the Implementation Schedule or within another timeframe agreed in writing.

The review and revision cycle shall be repeated as necessary until the deliverable fully complies with the requirements of the Technical Specification and is formally accepted by the MAFWE.

A deliverable shall be deemed accepted only upon written confirmation issued by the MAFWE. Formal acceptance of deliverables shall constitute a prerequisite for progression to subsequent project phases, where applicable.

The Supplier shall maintain a version-controlled record of all submitted deliverables, including submission dates, review comments, revision history, and acceptance status.

Detailed submission deadlines, review periods, revision timelines, and acceptance authorities for each deliverable are defined in the Implementation Schedule Table (Section 4.1).

#### 4.4. System Inventory Table (Supply and Installation Cost Items) Section VII – B, C and D

System, Subsystem, or lot number: **entire System procurement**

Line-item number: **entire Implementation Schedule**

Line Item No.	Subsystem / Item	Relevant Technical Specifications No.	Additional Site Information (e.g., building, floor, department, etc.)	Quantity
0	Preparation Phase		MAFWE Data Center	--
0.1	Project Inception Report	2.10.1	--	--
0.2	Institutional Readiness Review Report	2.10.1	--	--
0.3	Project Plan	2.10.1	--	--
0.4	Project Governance and Communication Plan	2.10.1	--	--
1	Phase 1 – Infrastructure Deployment	2.3	MAFWE Data Center	--
1.1	Technical Planning and Quality Assurance - Phase 1 (preparation and submission of documents)	2.10.2	--	--
1.2	Firewall Equipment (delivery and installation)	2.3.1	--	2
1.3	Server Equipment (delivery and installation)	2.3.2	--	--

Line Item No.	Subsystem / Item	Relevant Technical Specifications No.	Additional Site Information (e.g., building, floor, department, etc.)	Quantity
1.4	Database Server (RDBMS) and Licenses (delivery and installation)	2.4.1	--	1
1.5	GIS Server Platform and Licenses (delivery and installation)	2.4.2.1	--	1
1.6	GIS Desktop Software and Licenses (delivery and installation)	2.4.2.2	--	1
1.7	Technical Documentation and System Manuals	2.10.4	--	--
1.8	Source Code and Development Artifacts	2.10.5	--	--
1.9	Acceptance Report - Phase 1	2.10.3	--	--
2	Phase 2 – Redesign and Migration of the Primary Agricultural Registers (Farm Register and LPIS)	2.5.1.2.2	MAFWE Data Center	--
2.1	Technical Planning and Quality Assurance - Phase 2 (preparation and submission of documents)	2.10.2	--	--
2.2	Redesign of the Farm Register and data migration	2.5.1.2.2.1	--	1
2.3	Redesign of the LPIS and data migration	2.5.1.2.2.2	--	1
2.4	Technical Documentation and System Manuals	2.10.4	--	--
2.5	Source Code and Development Artifacts	2.10.5	--	--
2.6	Acceptance Report- Phase 2	2.10.3	--	--
3	Phase 3 – Introduction of the SALMIS	2.5.1.2.3	MAFWE Data Center	--

Line Item No.	Subsystem / Item	Relevant Technical Specifications No.	Additional Site Information (e.g., building, floor, department, etc.)	Quantity
3.1	Technical Planning and Quality Assurance - Phase 3 (preparation and submission of documents)	2.10.2	--	--
3.2	Implementation of SALMIS and data migration from temporary inventory	2.5.1.2.3	--	1
3.3	Technical Documentation and System Manuals	2.10.4	--	--
3.4	Source Code and Development Artifacts	2.10.5	--	--
3.5	Acceptance Report- Phase 3	2.10.3	--	--
4	Phase 4 – Legacy Systems Modernization	2.5.1.2.2	MAFWE Data Center	--
4.1	Technical Planning and Quality Assurance - Phase 4 (preparation and submission of documents)	2.10.2	--	--
4.2	Redesign and modernization of: <ul style="list-style-type: none"> <li>Monitoring Software for Agricultural Cooperatives;</li> <li>Information System for Evidence of Tobacco (ISET);</li> <li>Agricultural Products Buyers;</li> <li>Organic Farming Information System</li> <li>Agricultural Market Information System (AMIS).</li> </ul>	2.5.1.2.2.3 - 2.5.1.2.2.7	--	1
4.3	Technical Documentation and System Manuals	2.10.4	--	--
4.4	Source Code and Development Artifacts	2.10.5	--	--
4.5	Acceptance Report- Phase 4	2.10.3	--	--

Line Item No.	Subsystem / Item	Relevant Technical Specifications No.	Additional Site Information (e.g., building, floor, department, etc.)	Quantity
5	Phase 5 – Introduction of New Registries and Domain-Specific Datasets	2.5.1.2.4	MAFWE Data Center	--
5.1	Technical Planning and Quality Assurance - Phase 5 (preparation and submission of documents)	2.10.2	--	--
5.2	Implementation of newly established registries and domain-specific datasets defined in Annex B	2.5.1.2.4	--	1
5.3	Technical Documentation and System Manuals	2.10.4	--	--
5.4	Source Code and Development Artifacts	2.10.5	--	--
5.5	Acceptance Report - Phase 5	2.10.3	--	--
6	Phase 6 – Introduction of the BI Platform	2.6	MAFWE Data Center	--
6.1	Technical Planning and Quality Assurance - Phase 6 (preparation and submission of documents)	2.10.2	--	--
6.2	BI Software installation and Licensing (delivery and installation)	2.6.1 – 2.6.3 2.7.4	--	10
6.3	BI Implementation and Customization	2.6.4 2.7.1 – 2.7.3	--	1
6.4	Technical Documentation and System Manuals	2.10.4	--	--
6.5	Source Code and Development Artifacts	2.10.5	--	--

Line Item No.	Subsystem / Item	Relevant Technical Specifications No.	Additional Site Information (e.g., building, floor, department, etc.)	Quantity
6.6	Acceptance Report - Phase 6	2.10.3	--	--
7	Phase 7 – Interoperability Enablement and Service Publication	2.5.4	MAFWE Data Center	--
7.1	Technical Planning and Quality Assurance - Phase 7 (preparation and submission of documents)	2.10.2	--	--
7.2	IAIP Service Publication	2.5.4.1 – 2.5.4.2	--	1
7.3	Institutional Coordination and Activation	4.1.9	--	--
7.4	Technical Documentation and System Manuals	2.10.4	--	--
7.5	Source Code and Development Artifacts	2.10.5	--	--
7.6	Acceptance Report - Phase 7	2.10.3	--	--
8	Training and Training Materials	2.8	MAFWE Data Center	--
8.1	Training and Training Materials for Phase 1 – Infrastructure Deployment	2.8	--	1
8.2	Training and Training Materials for Phase 2 – Redesign and Migration of the Primary Agricultural Registers (Farm Register and LPIS)	2.8	--	--
8.3	Training and Training Materials for Phase 3 – Introduction of the SALMIS	2.8	--	--

Line Item No.	Subsystem / Item	Relevant Technical Specifications No.	Additional Site Information (e.g., building, floor, department, etc.)	Quantity
8.4	Training and Training Materials for Phase 4 – Legacy Systems Modernization	2.8	--	--
8.5	Training and Training Materials for Phase 5 – Introduction of New Registries and Domain-Specific Datasets	2.8	--	--
8.6	Training and Training Materials for Phase 6 – Introduction of the BI Platform	2.8	--	--
8.7	Training and Training Materials for Phase 7 – Interoperability Enablement and Service Publication	2.8	--	--
9	Project Closure		MAFWE Data Center	--
9.1	Knowledge Transfer Completion Report	2.10.7		
9.2	Final System Documentation Package	2.10.7		
9.3	Final Data Migration Validation Report	2.10.7		
9.4	Final System Acceptance Report	2.10.7		
9.5	Final Project Implementation Report	2.10.7		
9.6	Documentation of Platform Dependencies	2.9.3		
10	Technical Support	2.11	MAFWE Data Center	24 months
11	Sustainability and Exit Plan	2.9.2.3	MAFWE Data Center	--

**Note:** - - indicates not applicable. “ indicates repetition of table entry above.

#### 4.5. System Inventory Table (Recurrent Cost Items) Section VII – B, C and D

System, Subsystem, or lot number: **entire System procurement**

Line-item number: **entire Implementation Schedule**

All recurrent costs related to operation, maintenance, licensing and technical support of the IAIP platform during the 24-month warranty period are included in the Supplier's warranty obligations and are therefore not subject to separate pricing.

Line Item No.	Subsystem / Item	Relevant Technical Specifications No.	Y1	Y2
0	Preparation Phase		--	--
0.1	Project Inception Report	2.10.1	--	--
0.2	Institutional Readiness Review Report	2.10.1	--	--
0.3	Project Plan	2.10.1	--	--
0.4	Project Governance and Communication Plan	2.10.1	--	--
1	Phase 1 – Infrastructure Deployment	2.3	--	--
1.1	Technical Planning and Quality Assurance - Phase 1 (preparation and submission of documents)	2.10.2	--	--
1.2	Firewall Equipment (delivery and installation)	2.3.1	Incl. in Warranty	Incl. in Warranty
1.3	Server Equipment (delivery and installation)	2.3.2	Incl. in Warranty	Incl. in Warranty

Line Item No.	Subsystem / Item	Relevant Technical Specifications No.	Y1	Y2
1.4	Database Server (RDBMS) and Licenses (delivery and installation)	2.4.1	Incl. in Warranty	Incl. in Warranty
1.5	GIS Server Platform and Licenses (delivery and installation)	2.4.2.1	Incl. in Warranty	Incl. in Warranty
1.6	GIS Desktop Software and Licenses (delivery and installation)	2.4.2.2	Incl. in Warranty	Incl. in Warranty
1.7	Technical Documentation and System Manuals	2.10.4	--	--
1.8	Source Code and Development Artifacts	2.10.5	--	--
1.9	Acceptance Report - Phase 1	2.10.3	--	--
2	Phase 2 – Maintenance of the Primary Agricultural Registers (Farm Register and LPIS)	2.5.1.2.2	--	--
2.1	Technical Planning and Quality Assurance - Phase 2 (preparation and submission of documents)	2.10.2	--	--
2.2	Maintenance of the Farm Register	2.5.1.2.2.1	Incl. in Warranty	Incl. in Warranty
2.3	Maintenance of the LPIS	2.5.1.2.2.2	Incl. in Warranty	Incl. in Warranty
2.4	Technical Documentation and System Manuals	2.10.4	--	--
2.5	Source Code and Development Artifacts	2.10.5	--	--
2.6	Acceptance Report - Phase 2	2.10.3	--	--
3	Phase 3 – Introduction of the SALMIS	2.5.1.2.3	--	--

Line Item No.	Subsystem / Item	Relevant Technical Specifications No.	Y1	Y2
3.1	Technical Planning and Quality Assurance - Phase 3 (preparation and submission of documents)	2.10.2	--	--
3.2	Maintenance of SALMIS	2.5.1.2.3	Incl. in Warranty	Incl. in Warranty
3.3	Technical Documentation and System Manuals	2.10.4	--	--
3.4	Source Code and Development Artifacts	2.10.5	--	--
3.5	Acceptance Report - Phase 3	2.10.3	--	--
4	Phase 4 – Legacy Systems Modernization	2.5.1.2.2	--	--
4.1	Technical Planning and Quality Assurance - Phase 4 (preparation and submission of documents)	2.10.2	--	--
4.2	Maintenance of modernized legacy systems: <ul style="list-style-type: none"> <li>• Monitoring Software for Agricultural Cooperatives;</li> <li>• Information System for Evidence of Tobacco (ISET);</li> <li>• Agricultural Products Buyers;</li> <li>• Organic Farming Information System</li> <li>• Agricultural Market Information System (AMIS).</li> </ul>	2.5.1.2.2.3 - 2.5.1.2.2.7	Incl. in Warranty	Incl. in Warranty
4.3	Technical Documentation and System Manuals	2.10.4	--	--
4.4	Source Code and Development Artifacts	2.10.5	--	--
4.5	Acceptance Report - Phase 4	2.10.3	--	--

Line Item No.	Subsystem / Item	Relevant Technical Specifications No.	Y1	Y2
5	Phase 5 – Maintenance of New Registries and Domain-Specific Datasets	2.5.1.2.4	--	--
5.1	Technical Planning and Quality Assurance - Phase 5 (preparation and submission of documents)	2.10.2	--	--
5.2	Maintenance of newly established registries and domain-specific datasets defined in Annex B	2.5.1.2.4	Incl. in Warranty	Incl. in Warranty
5.3	Technical Documentation and System Manuals	2.10.4	--	--
5.4	Source Code and Development Artifacts	2.10.5	--	--
5.5	Acceptance Report - Phase 5	2.10.3	--	--
6	Phase 6 – Maintenance of the BI Platform	2.6	--	--
6.1	Technical Planning and Quality Assurance - Phase 6 (preparation and submission of documents)	2.10.2	--	--
6.2	BI Software installation and Licensing (delivery and installation)	2.6.1 – 2.6.3 2.7.4	Incl. in Warranty	Incl. in Warranty
6.3	BI Implementation and Customization	2.6.4 2.7.1 – 2.7.3	Incl. in Warranty	Incl. in Warranty
6.4	Technical Documentation and System Manuals	2.10.4	--	--
6.5	Source Code and Development Artifacts	2.10.5	--	--

Line Item No.	Subsystem / Item	Relevant Technical Specifications No.	Y1	Y2
6.6	Acceptance Report - Phase 6	2.10.3	--	--
7	Phase 7 – Interoperability Enablement and Service Publication	2.5.4	--	--
7.1	Technical Planning and Quality Assurance - Phase 7 (preparation and submission of documents)	2.10.2	--	--
7.2	Maintenance of published IAIP Services	2.5.4.1 – 2.5.4.2	Incl. in Warranty	Incl. in Warranty
7.3	Institutional Coordination	4.1.9	Incl. in Warranty	Incl. in Warranty
7.4	Technical Documentation and System Manuals	2.10.4	--	--
7.5	Source Code and Development Artifacts	2.10.5	--	--
7.6	Acceptance Report - Phase 7	2.10.3	--	--
8	Training and Training Materials	2.8	--	--
8.1	Training and Training Materials for Phase 1 – Infrastructure Deployment	2.8	--	--
8.2	Training and Training Materials for Phase 2 – Redesign and Migration of the Primary Agricultural Registers (Farm Register and LPIS)	2.8	--	--

Line Item No.	Subsystem / Item	Relevant Technical Specifications No.	Y1	Y2
8.3	Training and Training Materials for Phase 3 – Introduction of the SALMIS	2.8	--	--
8.4	Training and Training Materials for Phase 4 – Legacy Systems Modernization	2.8	--	--
8.5	Training and Training Materials for Phase 5 – Introduction of New Registries and Domain-Specific Datasets	2.8	--	--
8.6	Training and Training Materials for Phase 6 – Introduction of the BI Platform	2.8	--	--
8.7	Training and Training Materials for Phase 7 – Interoperability Enablement and Service Publication	2.8	--	--
9	Project Closure		--	--
9.1	Knowledge Transfer Completion Report	2.10.7	--	--
9.2	Final System Documentation Package	2.10.7	--	--
9.3	Final Data Migration Validation Report	2.10.7	--	--
9.4	Final System Acceptance Report	2.10.7	--	--
9.5	Final Project Implementation Report	2.10.7	--	--

Line Item No.	Subsystem / Item	Relevant Technical Specifications No.	Y1	Y2
9.6	Documentation of Platform Dependencies	2.9.3	--	--
9	Technical Support	2.11	Incl. in Warranty	Incl. in Warranty
11	Sustainability and Exit Plan	2.9.2.3	--	--

**Note:** -- indicates not applicable. “ indicates repetition of table entry above.

**4.6. Site Table(s)**

System, Subsystem, or lot number: **entire System procurement**

Site Code	Site	City / Town / Region	Primary Street Address	Drawing Reference No. (if any)
HQ	MAFWE Headquarters	Skopje	Leninova 2, Skopje – Centar, Republic of North Macedonia	n/a

#### 4.7. Table of Holidays and Other Non-Working Days

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Month	2026	2027		....			...	20zz
1	2	2						
2	0	0						
3	1	0						
4	1	2						
5	2	1						
6	0	0						
7	0	0						
8	1	1						
9	1	1						
10	2	1						
11	0	0						
12	1	1						

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