



Česká rozvojová agentura



ČESKÁ REPUBLIKA
POMÁHÁ



Tender technical requirements and conditions

The register of fertilizers in BiH



Ústřední kontrolní a zkušební
ústav zemědělský
Oddělení komunikace a
zahraniční spolupráce

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Česká rozvojová agentura



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Terms and abbreviations

Term	Meaning
AAA	Authentication, Authorization and Audit
ACL	Access List - a list of users and their authorizations.
AD / MS AD	Microsoft Active Directory - a set of Applications and services used to control users, computers, resources and their roles and access within a so called "Windows Domain" network.
ADSL	Asymmetric Digital Subscriber Line - a data communications technology that enables data transmission over copper telephone lines.
API	Application Programming Interface - An interface designed to be access, deserialised and used by automated electronic means such as computer programs etc.
Application	A software application used to support some process.
AR	Architectural requirement / Architecture requirement
ArchiMate	A notation for software/hardware/orgware inventarization, organization and design.
B/Byte MB/MegaByte	Unit for information data size.
BiH	The entire state of Bosna and Hercegovina
Brč	The Brčko District - a single administrative unit of local self-government existing under the sovereignty of Bosnia and Herzegovina.
canton	Organizational sub-division unit of FBiH.
ČR	Česká republika - a country in central Europe.
ČRA	Česká rozvojová agentura - Czech development agency - and organizational unit of the Czech government in ČR, funding specific projects.
data entity	A data record/sentence, whose attributes relate to the same real-world object. Not to be confused with the term "entity" of the business-political scope in the country Bosna and Hercegovina.
DB	Database - may refer either to the data itself or an entire RDBMs and its services.
dep.	Department
Deployment	Making some application or entire IT system operational and available for its users to use its functionalities.
entity	One of the two entities (autonomous country parts) forming the state of Bosna and Hercegovina. As third self-governed district (can be considered as 3rd site/instance in terms of IT system) there is the district of Brčko.
E-SSO	Enterprise Single-Sign-On - a (SW) solution for centralized user authentication and authorization management within a network/organization.
EU	European union
Excel	Microsoft Office Excel - software for spreadsheet processing.
FBiH	One of the two entities forming BiH: the Federation of Bosna and Hercegovina
Fertilizer	Agens and/or auxillary agens used to improve the properties of soil when concerning the growing of plants.
file	Set of electronic data belonging together
FR	Functional requirement



GUI	Graphical User Interface - interface of a software designed to be used by humans by displaying information in a graphical form typical for common inter-human understanding.
HW	Hardware
Hyper-V	Virtualization environment of the Windows platform (MS) used to run multiple "virtual" computers on one single computer hardware.
I/O	Input/Output
ID	Identifier / identification number
Internet	An open computer network on a global level, using common protocols, administered by IANA and its sub-accreditities.
IR	Integration requirement
IT	Information technology
KM	Konvertibilna Marka - Bosnia and Hercegovina convertible mark - local currency i BiH
LDAP	Lightweight Directory Access Protocol - a protocol used to access tree-organized data structures, typically structures of user account data (such as MS AD).
LOD	Leve-of-detail - how detailed is the subject depicted.
LR	(software) Legal requirement
MfA	Ministry for Agriculture, water-management and forestry in FBiH
MoA	Ministry of agriculture (either RS or FBiH)
module	A part of application
MOFTER	BiH - Ministry for foreign trade and economic relations
MR	(data) Migration requirement
MS	Microsoft - a major global software provider.
MVC	Model-View-Controller - a programming paradigm e.g. how a software application source code is internally organised and understood by it programmers.
Mx	Project milestone
network	Multiple computers and other electronic devices interconnected together by a common electric and logic protocol.
OR	Operating / Operational requirement
ORM	Object-Relational Mapping - a technique representing RDBMs (or other data-storage) objects as code classes with create-retrieve-update-delete or other business functionality, making the client-database communication transparent.
orgware/OW	Set of organizational measures (administrative decrees, people, their roles and responsibilities etc.) achieving some common goal.
OS	Operating system - basic application to provide user interaction with a computer, especially then the service of loading and launching other applications.
OU / MS AD OU	Organizational unit - a logical data unit containing data of an MS AD
PA	Project action requirement
PC	Project cooperation requirement/specification
PHPA	National plant protection agency of MOFTER BiH
PL	(project) Legal requirement
PM	Project management / Project management requirement
PO	Project Output requirement
PR	Performance requirement



px	pixels - a basic unit of graphical display of a computer output on a computer screen
Q/A	Question / Answer
RAM	Random access memory - a fast volatile computer memory holding data and software being currently executed.
RDBMS	Relational database management system - an IT Application used to store and retrieve data entities interconnected together (referenced between themselves).
Register	In the scope of this document: the aggregate of technical, organizational and other measures to provide the record and evidence of the data in question.
Rešenje	Local term for the act of "administrative decision".
RS	One of the two entities forming BiH: the Republika Srpska.
script	How carious characters/letters are depicted on a computer screen (based on their originating handwriting such as "Latin", "Cyrillic" etc.)
SLA	Service level agreement - measurable parameters how fast / in what deadlines some service should be delivered.
SQL	Structure Query Language - a language specified and maintained by the appropriate authority used to manipulate data and data structures in RDBMs.
SR	Security requirement
SW	Software
Tender###	Tender proposal description requirement
TR	Testing requirement
UKZUZ (alt.: UZUS)	Ústřední kontrolní a zkušební ústav zemědělský - Central institute for control and testing in agriculture - an organizational unit of the Czech government in ČR.
UML	A notation used for software design.
UR	User requirement (non-functional requirement applicable the entire application).
WS	Web-service - a type of API accessible over a network.



1. Tender requirements - Overview

General overview

The implementation of the Register of fertilizers helps to establish a favourable environment for the transition to the information society and to provision of IT support to the competent authorities in order to increase the food protection in Bosna and Hercegovina and ensure the trace ability of fertilizers and ensuring their sanity and protection, not only for enhancing market and consumer protection, but also for protecting the national soil resources against degradation and contamination.

Considering the principles of modularity and expandability of establishment of the system, both subjects handling the fertilizers as well the fertilizers themselves have to be recorded, as well as the number of information objects recorded in the system and the number of data for each of them can be increased.

In order to achieve this, the system has to be integrated into the current environment of the:

- Ministry of Foreign Trade and Economic Relations - Administration of BiH for Plant Health Protection (PHPA)
- Federal Ministry for Agriculture, Water-management and Forestry
- Ministry for Agriculture, Forestry and Water-management Republika Srpska
- The Department for Agriculture , Water-management and Forestry Brčko district BiH

especially when concerning the integration with the respective infrastructure systems (concerning user authentication where applicable).

Purposes

Purposes of the system that have to be addressed within the delivery of the software (including the planned means of fulfilment during the analysis phase for the “Analysis and system design documentation” etc.):

- 1) enrolment of persons (subjects) whose business activity contains the import or sale of fertilizers in either entity (FBiH/RS/Brčko) in Bosna and Hercegovina;
- 2) registration of person's activities and storage/sale places of them;
- 3) possibility to keep records and permit the sale/import of fertilizers;
- 4) Accessibility of the records (as mentioned in the items above) from each of the entities and their aggregated publication for public access of entities such as the customs offices, the public (farmers) etc.

2. Tender requirements - Local situation overview

A preliminary analysis has been done so far, revealing following information:

The country consists of 2 entities (Federation of Bosnia and Herzegovina, Republika Srpska) and Brčko district BiH, each of them running their own registration of fertilizers.



For the operation within certain business areas, the country is running its government agencies as central ones for all the three entities. In this case within the scope of this project this is done for certain processes (the aggregation and publishing of the lists of registered fertilizers and merchants/importers).

(All the information above can be observed in this document, where they have been captured by the respective diagrams).

As one may observe from the information captured in the aforementioned parts of this document, these processes are very similar, bearing only certain local changes.

Most importantly, as one may observe from the processes, the administration consists of two registers:

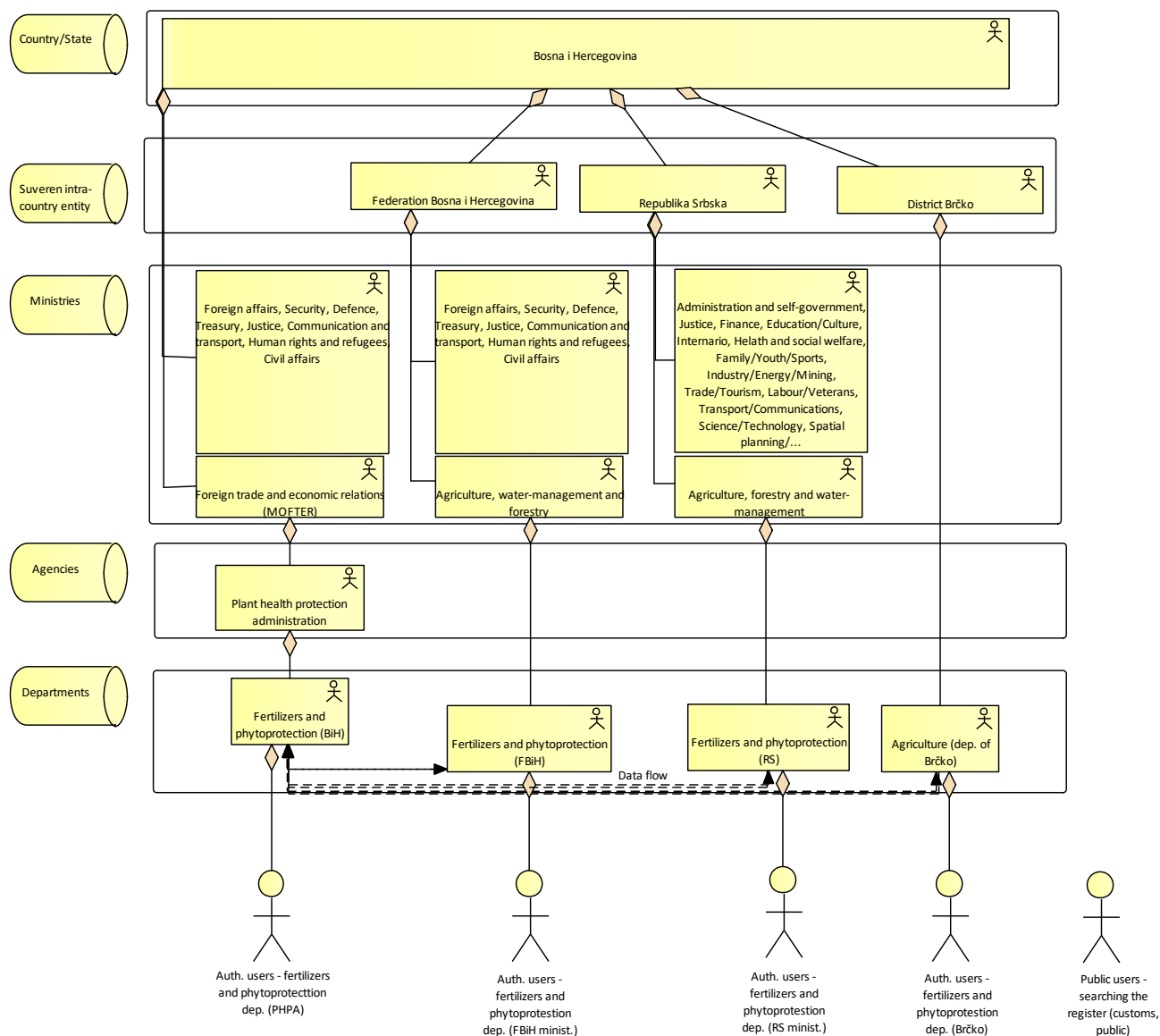
- the fertilizers themselves - a list of the fertilizers approved for import and sale
- the importers/suppliers - a list of the subjects (companies, or individual entrepreneurs) who are allowed to introduce the fertilizers onto the market

Both lists are then to be shared by the other administration bodies (such as but not limited to) custom officers, inspectors etc.

3. BiH fertilizers - Current status - as is (public)

3.1 Current status - as is (public) - Organization

3.1.1 Organization schema



The country (state establishment) consists of 2 entities (Federation of Bosna and Hercegovina, Republika Srpska) and Brčko district BiH:

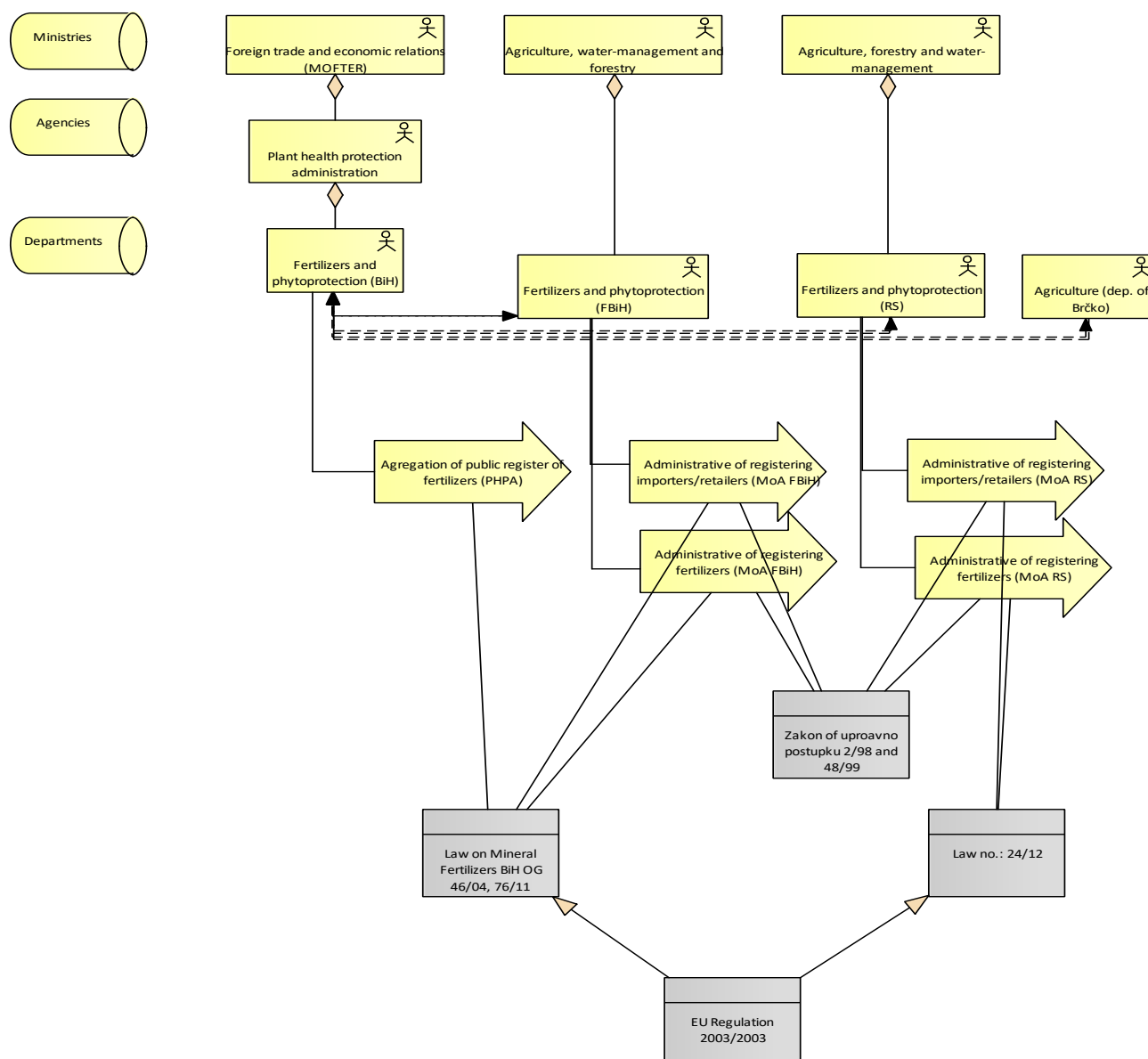
- FBIH - Federation Bosna i Hercegovina - the federation of 10 cantons,
- RS - Republika Srpska
- Brč – Brčko district BiH

The country (BiH) itself has certain governmental / administrative bodies as country-wide administration. This applies especially on the Ministry of foreign trade and economic relations, whose one organizational presented by the office for Plant health protection administration. This administration body plays its role in the phytosanitary area of the country's administration as well in the area of fertilizers - see their respective processes assignment in the respective diagram.

Both entities (RS and FBiH) are then running their own administrative bodies concerning especially the interior affairs. Important in the scope of this project are then the bodies for Agriculture, water-management and forestry / Agriculture, forestry and water-management, whose departments for Fertilizers and plant protection are responsible for the core processes assigned with the administration of fertilizers. The same goes for the department for Agriculture in the district of Brčko.

Auth. users - fertilizers and phytoprotection dep. (FBiH minist.) (::«ArchiMate_BusinessActor»)	Users: <ul style="list-style-type: none"> ▪ Resp. employees of the MfA (1-2 pers.) ▪ Inspectors ▪ Borders inspectors
Public users - searching the register (customs, public) (::«ArchiMate_BusinessActor»)	Consumers of the public parts of the register: <ul style="list-style-type: none"> ▪ Customs office inspectors ▪ The registrants / applicants ▪ Inspectors of federation ▪ PHPA

3.1.2 Organization-Processes





As one may observe from this diagram, the two entities and Brčko district BiH are running the very same processes, both based on the two major legislations:

- Zakon o upravnom postupku 2/98 and 48/99
- EU Regulation 2003/2003 which is implemented (specialized) into two local laws, one is "Law on Mineral Fertilizers OG BiH 46/04, 76/11" that is Law on the level BiH
- and "Law on Mineral Fertilizers OG RS no.: 24/12 " for RS.

The only "specific" process is then the aggregation of the lists from the entities, which is done by the country-wide administration office of PHPA.

Administrative of registering fertilizers (MoA FBiH) <small>(::«ArchiMate_BusinessProcess»)</small>	Form of registers: physical filing system (file cabinet). The deciding information is in physical dossiers on archive, the Excel is a mere helper.
Administrative of registering fertilizers (MoA RS) <small>(::«ArchiMate_BusinessProcess»)</small>	<ul style="list-style-type: none"> • 2 registers (1 register of importers and distributors, 1 of fertilizers itself), being done in Excel • The physical archive is the main and authoritative source of information. • Each of the persons has so many registrations as branch offices/sites, the same for fertilizers, each one from new producer has to be registered as new fertilizer, however the producer is identified by the originating country only • It is required that the registrars provide papers of analysis. • So far, the biggest problem – the importers and distributors giving analysis in different languages, so the translations have to be done. • There are about 42-50 records of importers/retailers and much less for fertilizers about per year.
Administrative of registering importers/retailers (MoA FBiH) <small>(::«ArchiMate_BusinessProcess»)</small>	<ul style="list-style-type: none"> • Form of registers: physical filing system (file cabinet). The crucial information is in physical dossiers on archive, the Excel is a mere helper. • Each registration (of importer/supplier) is for <u>one</u> storage facility only! Each storage facility can be for wholesale as well retail. Retail for each place of storage/sale (buying from the wholesales, cannot import)
Administrative of registering importers/retailers (MoA RS) <small>(::«ArchiMate_BusinessProcess»)</small>	<ul style="list-style-type: none"> • 2 registers (1 register of importers and distributors, 1 of fertilizers themselves), being done in Excel • The physical archive is the main and authoritative source of information. • Each of the persons has so many registrations as branch offices/sites, the same for fertilizers, each one from new producer has to be registered as new fertilizer, however the producer is identified by the originating country only. • There are about 42-50 records of importers/retailers annually and in total 600 of importers/retailers. • E-SSO based on MS AD
Law no.: 24/12 <small>(::«ArchiMate_BusinessObject»)</small>	♦ There is a law on the state label of BiH (used also in FBiH) and a law on the level of entity RS. Both of them are harmonized between each other and with EU regulation.
Zakon of uproavno postupku 2/98 and 48/99 <small>(::«ArchiMate_BusinessObject»)</small>	The administrative procedure is driven by the law: Zakon of uproavno postupku 2/98 and 48/99

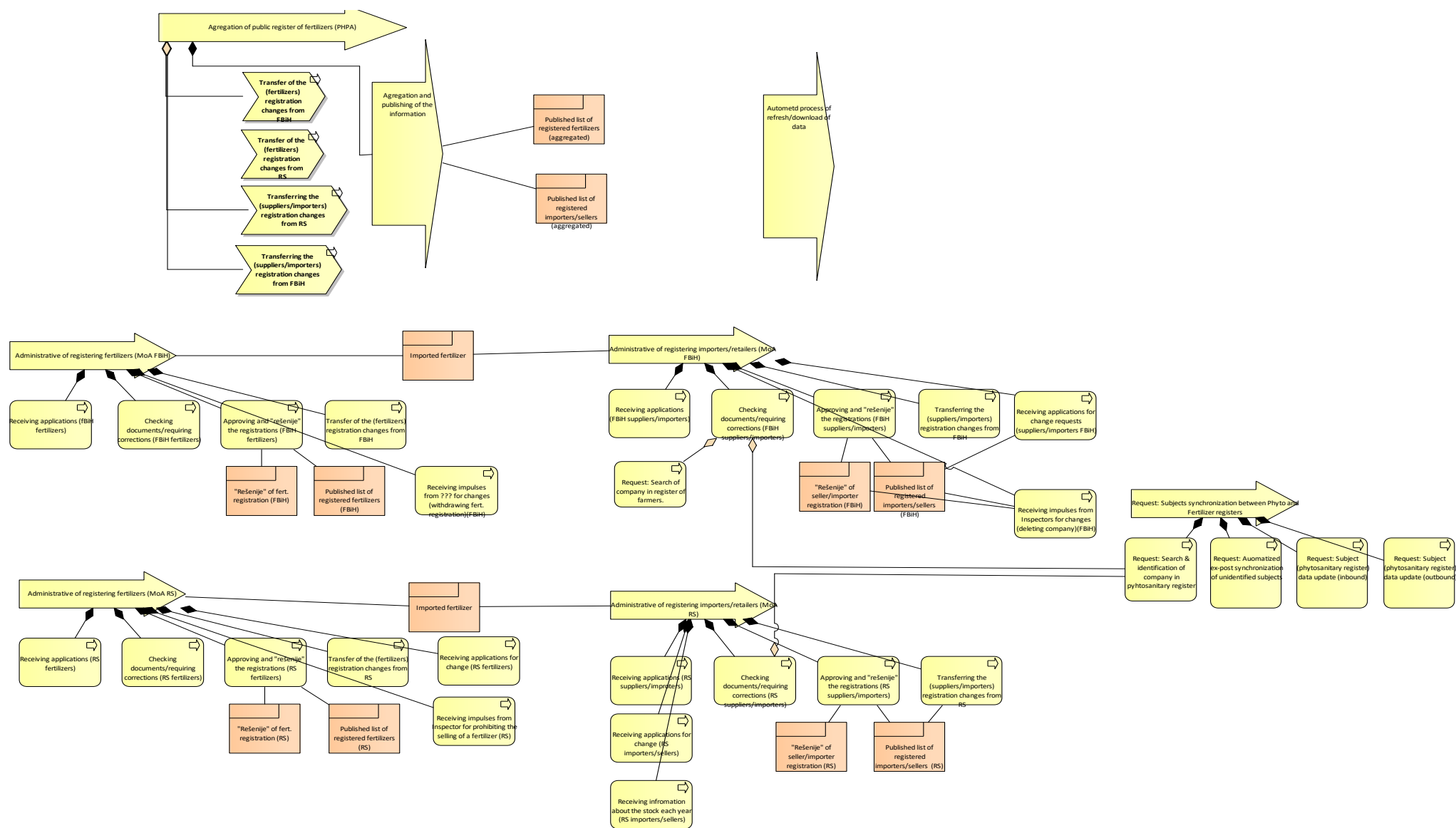
3.2 Current status - as is (public) - Processes

3.2.1 Processes structure schema



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Administrative of registering fertilizers (MoA FBiH) (::«ArchiMate_BusinessProcess»)	Form of registers: physical filing system (file cabinet). The deciding information is in physical dossiers on archive, the Excel is a mere helper.
Administrative of registering fertilizers (MoA RS) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> • 2 registers (1 register of importers and distributors, 1 of fertilizers itself), being done in Excel • The physical archive is the main and authoritative source of information. • Each of the persons has so many registrations as branch offices/sites, the same for fertilizers, each one from new producer has to be registered as new fertilizer, however the producer is identified by the originating country only • It is required that the registrars provide papers of analysis. • So far, the biggest problem – the importers and distributors giving analysis in different languages, so the translations have to be done. • There are about 42-50 records of importers/retailers and much less for fertilizers about per year.
Administrative of registering importers/retailers (MoA FBiH) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> • Form of registers: physical filing system (file cabinet). The crucial information is in physical dossiers on archive, the Excel is a mere helper. • Each registration (of importer/supplier) is for <u>one</u> storage facility only! Each storage facility can be for wholesale as well retail. Retail for each place of storage/sale (buying from the wholesales, cannot import)
Administrative of registering importers/retailers (MoA RS) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> • 2 registers (1 register of importers and distributors, 1 of fertilizers themselves), being done in Excel • The physical archive is the main and authoritative source of information. • Each of the persons has so many registrations as branch offices/sites, the same for fertilizers, each one from new producer has to be registered as new fertilizer, however the producer is identified by the originating country only. • There are about 42-50 records of importers/retailers annually and in total 600 of importers/retailers. • E-SSO.based on MS AD
Approving and "rešenje" the registrations (FBiH suppliers/importers) (::«ArchiMate_BusinessProcess»)	Register of importers/suppliers - Wholesale (each one reg. for each place of storage); only a wholesale may register fertilizer!!!! (and Import fertilizers!!!!)
Approving and "rešenje" the registrations (RS fertilizers) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> ◆ We issue the final report (decision) and send back using the mail and enter all the information in register and the table under the specific number. The registration lasts then forever without any deadline.
Approving and "rešenje" the registrations (RS suppliers/importers) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> ◆ We issue the final report (decision) and send back using the mail and enter all the information in register and the table under the specific number. The registration lasts then forever without any deadline. ◆ Reports/outputs: Rešenje (administrative decision), and the list in Excel ◆ The update on web done every 6 months but can be more frequent.
Checking documents/requiring corrections (FBiH fertilizers) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> • Checking the document is done afterwards, we have a checklist for this, if questions/doubts the ministry contact the applicant, and final report is written. • Multiplicity of fertilizers is based on the difference of same fertilizer and different production place, but if same fertilizer and production place is found, then the registration is stopped and seen as valid due to the previous registration. <p>Register of importers/suppliers Wholesale (each one reg. for each place of storage); only a wholesale may:</p> <ul style="list-style-type: none"> • register fertilizer • import fertilizers



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	The fertilizers itself have to be checked for existing registration in both lists.!!
Checking documents/requiring corrections (FBiH suppliers/importers) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> Branch offices have their IDs of business as the companies. Each registration (of importer/supplier) is for <u>one</u> storage facility only! Each storage facility can be for wholesale as well retail. The suppliers/importers are being checked and searched in the respective register by the seat (main headquarters address) of the company (a RS company will be most probably registered in the RS register, if it has a branch office also in FBiH then it has to be registered at the FBiH court), and the fertilizers themselves have to be checked in both lists.!!! Notes on usage in phytosanitary register: Address registry in BiH only up to the level of cities, then the street + number written by hand, the worldwide only up to the Country, then by hand. No checking.
Checking documents/requiring corrections (RS fertilizers) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> The ministry checks the documentation, two forms, one for the application in register of suppliers/importers, the other one of fertilizers. Wholesale/retail – is evidenced. Retail can register new fertilizers, not sure yet.
Checking documents/requiring corrections (RS suppliers/importers) (::«ArchiMate_BusinessProcess»)	<p>The ministry checks the documentation, two forms, one for the application in register of suppliers/importers, the other one of fertilizers.</p> <ul style="list-style-type: none"> Each legal person has its ID, unique across the entire state. Q: Checking when registering, if the company has not been registered in federation? A: No, not checking.
Receiving applications (fBiH fertilizers) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> The tax for registration is 35KM per fertilizer. The application form is sent by the post. The laboratory report is part of the application.
Receiving applications (RS fertilizers) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> The application is sent by post including relevant documentation.
Receiving applications (RS suppliers/importers) (::«ArchiMate_BusinessProcess»)	<p>The application is sent by post including relevant documentation.</p> <ul style="list-style-type: none"> Tax for new registration = 10KM.
Receiving applications for change (RS fertilizers) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> The application is sent by post including relevant documentation. Changes based on applications from the clients (companies) (changing of branch offices...).
Receiving applications for change (RS importers/sellers) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> The application is sent by post including relevant documentation. Changes based on applications from the clients (companies) (changing of branch offices...). Tax of change registration = 0KM
Receiving applications for change requests (suppliers/importers FBiH) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> The changes of the data are noticed from the importer (typically change of location of the storage or responsible person for the fertilizer in the company or require the removal of the). If no notice is given, then the data remain intact.
Receiving impulses from ??? for changes (withdrawing fert. registration)(FBiH) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> If it is found that the real components (ingredients) of the fertilizer have changed (for example it can cause some damage of the crop or soil), than the registration can be withdrawn.
Receiving impulses from Inspector for prohibiting the selling of a fertilizer (RS) (::«ArchiMate_BusinessProcess»)	<ul style="list-style-type: none"> However the inspectors cannot give impulse for deleting from register, they are only allowed to prohibit the specific fertilizer to be sold.
Receiving impulses from Inspectors for changes (deleting company)(FBiH)	<p>If a company is closed, only inspectors are allowed to find out and submit the information to the register.</p>



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The register of fertilizers in BiH



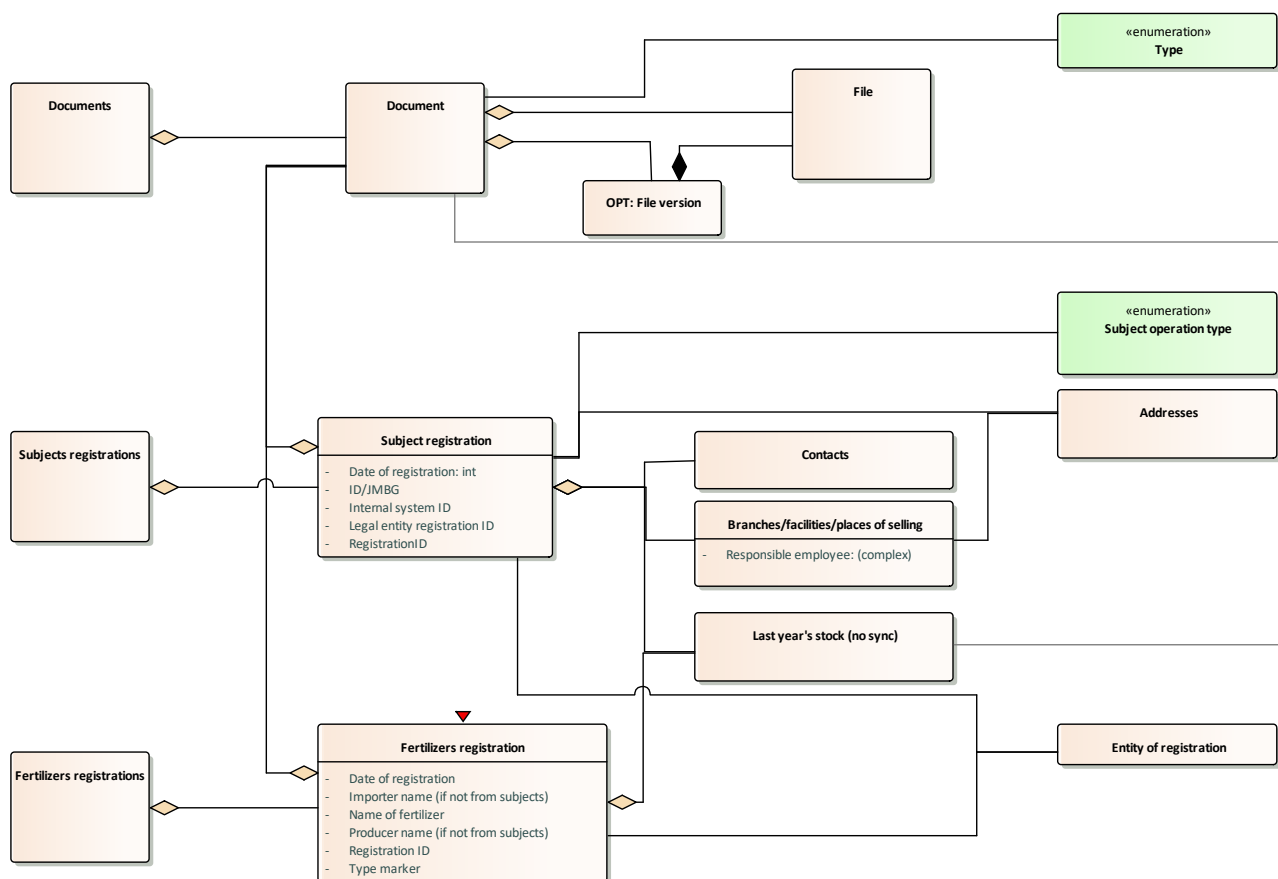
(::«ArchiMate_BusinessProcess»)	
Receiving information about the stock each year (RS importers/sellers) (::«ArchiMate_BusinessProcess»)	The applicants inform us about the imported fertilizers or stock, it is mandatory for the applicants (once a year until 31 st March info for the previous years and this is controlled by inspectors).
Request: Automated export synchronization of unidentified subjects (::«ArchiMate_BusinessProcess»)	When a company was introduced into the register of fertilizers and could not be paired with a corresponding subject from the Phyto register, the system should regularly check these subjects and try to re-identify them with the subjects introduced/existing/changed in Phyto register.
Request: Search & identification of company in phytosanitary register (::«ArchiMate_BusinessProcess»)	When a company is being introduced into the register of fertilizers, such a company has to be identified and (optionally) paired with a corresponding subject from the Phyto register.
Request: Search of company in register of farmers. (::«ArchiMate_BusinessProcess»)	CONCLUSION: NOT RELEVANT FOR FERTILIZERS REGISTER - the prefill of data not necessary since the subjects do not overlap typically. Request for integration: connecting to register of farmers. (Authors note: as seen in the phytosanitary register ... RPG, register of agricultural producers)
Request: Subject (phytosanitary register) data update (inbound) (::«ArchiMate_BusinessProcess»)	When a company was introduced into the register of fertilizers and could be paired with a corresponding subject from the Phyto register, the system should regularly check these subjects for changes and - if the subject attributes in register of fertilizers are not marked as blocked for external update - update their data according to the change in the Phyto register.
Request: Subject (phytosanitary register) data update (outbound) (::«ArchiMate_BusinessProcess»)	When a company was introduced into the register of fertilizers and could be paired with a corresponding subject from the Phyto register, the system should provide means for Phyto register (eventually others) to regularly check these subjects for changes and update their data according to the change in the register of fertilizers.
Request: Subjects synchronization between Phyto and Fertilizer registers (::«ArchiMate_BusinessProcess»)	There are needs to sync subjects between Phyto and Fertilizer registers
Transfer of the (fertilizers) registration changes from FBiH (::«ArchiMate_BusinessProcess»)	Using excel to have the lists, every 3 months sending the Excel to the PHPA. fmpvs.gov.ba. The same excel table is then published on the web.
Transferring the (suppliers/importers) registration changes from FBiH (::«ArchiMate_BusinessProcess»)	Using excel to have the lists, every 3 months sending the Excel to the PHPA. fmpvs.gov.ba. The same excel table is then published on the web.
"Rešenje" of seller/importer registration (FBiH)	<ul style="list-style-type: none"> ▪ A registered importer/supplier can supply/import any fertilizer if it has been registered. ▪ System outputs: only the final "rešenje" (administrative decision, ruling) (one for reg. fertilizers and one for register of importers) is present. Maybe some of deleting etc.
Imported fertilizer	<ul style="list-style-type: none"> ▪ A registered importer/supplier can supply/import any fertilizer if it has been registered.
Imported fertilizer	<ul style="list-style-type: none"> ▪ A registered importer/supplier can supply/import any fertilizer if it has been registered.
Published list of registered importers/sellers (RS)	<ul style="list-style-type: none"> ♦ The update on web done every 6 months but can be more frequent. ▪ Excel: name of producer, name of the fertilizer, number of the rešenje, datum of the rešenje and the name of the legal person. It also helps those interested to find out the list of fertilizers available. ▪ Excel internal: has more columns with detailed information.



4. BiH fertilizers - System to-be

4.1 System to-be - Data drafts (logical classes)

4.1.1 Data drafts (logical classes)



Addresses

Class

The "no sync" requirements is valid only then and then, if only a single entity shall use this feature.

Rel. from: () Addresses. to: () Subject registration.

Rel. from: () Addresses. to: () Branches/facilities/places of selling.

Branches/facilities/places of selling

Class

The "no sync" requirements is valid only then and then, if only a single entity shall use this feature.

Rel. from: () Branches/facilities/places of selling. to: () Subject registration.

Rel. from: () Addresses. to: () Branches/facilities/places of selling.



Tender technical requirements and conditions

The register of fertilizers in BiH



Attr. (name)	Not null	Is PK	Dat. type	Size	Description
Responsible employee			(complex)		

Contacts

Class

The "no sync" requirements is valid only then and then, if only a single entity shall use this feature.

Rel. from: () Contacts. to: () Subject registration.

Document

Class

A document (file) uploaded into the system.

Rel. from: () Document. to: () Fertilizers registration.

Rel. from: () Document. to: () Subject registration.

Rel. from: () Document. to: () Documents.

Rel. from: () File. to: () Document.

Rel. from: () Type. to: () Document.

Rel. from: () Last year's stock (no sync). to: () Document.

Rel. from: () OPT: File version. to: () Document.

Documents

Class

Represents the entire collection - an "entry point" into the data entities.

Rel. from: () Document. to: () Documents.

Fertilizers registration

Class

The fertilizer - allowed to entry the BiH market.

Rel. from: () Fertilizers registration. to: () Fertilizers registrations.

Rel. from: () Entity of registration. to: () Fertilizers registration.

Rel. from: () Document. to: () Fertilizers registration.

Rel. from: () Last year's stock (no sync). to: () Fertilizers registration.

Attr. (name)	Not null	Is PK	Dat. type	Size	Description
Date of registration					



Tender technical requirements and conditions

The register of fertilizers in BiH



◆ Importer name (if not from subjects)					
◆ Name of fertilizer					
◆ Producer name (if not from subjects)					Note: Of course, the fact, that the "Name" attributes are not stored with the fertilizer (if being taken from the registered Subjects) does not mean, that such (one-cell / one-line name) must not / will not appear in any list/report.
◆ Registration ID					
◆ Type marker					

Fertilizers registrations

Class

Represents the entire collection - an "entry point" into the data entities.

✍ Rel. from: () Fertilizers registration. to: () Fertilizers registrations.

Last year's stock (no sync)

Class

The "no sync" requirements is valid only then and then, if only a single entity shall use this feature.

✍ Rel. from: () Last year's stock (no sync). to: () Subject registration.

✍ Rel. from: () Last year's stock (no sync). to: () Fertilizers registration.

✍ Rel. from: () Last year's stock (no sync). to: () Document.

Subject registration

Class

Registered subject for handling fertilizers (import/sale)

✍ Rel. from: () Subject registration. to: () Subjects registrations.

✍ Rel. from: () Subject registration. to: () Subjects registrations.

✍ Rel. from: () Addresses. to: () Subject registration.

✍ Rel. from: () Subject operation type. to: () Subject registration.

✍ Rel. from: () Branches/facilities/places of selling. to: () Subject registration.

✍ Rel. from: () Last year's stock (no sync). to: () Subject registration.

✍ Rel. from: () Document. to: () Subject registration.

✍ Rel. from: () Entity of registration. to: () Subject registration.

✍ Rel. from: () Contacts. to: () Subject registration.



Attr. (name)	Not null	Is PK	Dat. type	Size	Description
◆ Date of registration			int		
◆ ID/JMBG					
◆ Internal system ID					
◆ Legal entity registration ID					
◆ RegistrationID					

Subjects registrations

Class

Represents the entire collection - an "entry point" into the data entities.

✎ Rel. from: () Subject registration.

to: () Subjects registrations.

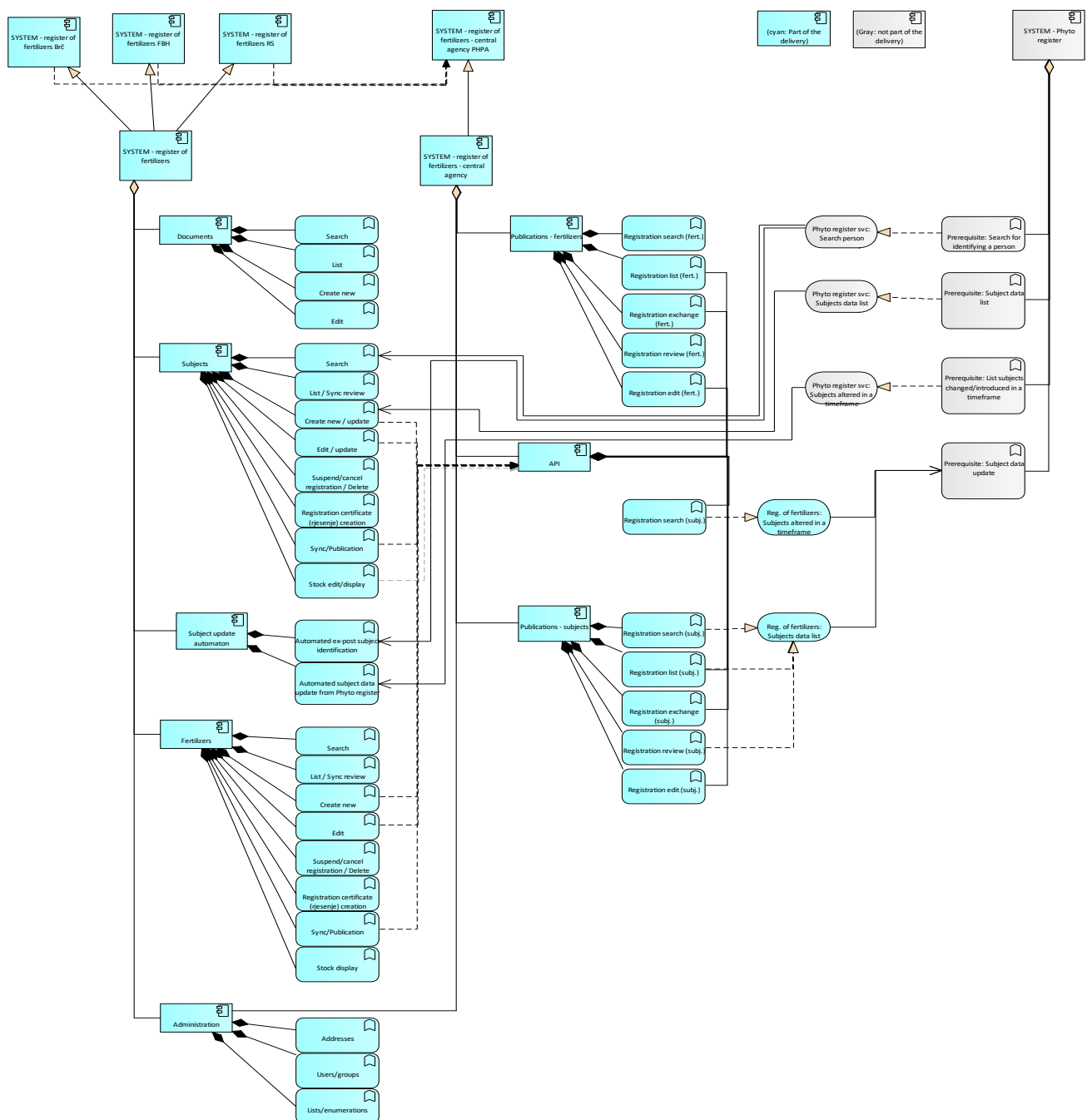
4.2 System to-be - Architecture

4.2.1 Architecture



Tender technical requirements and conditions

The register of fertilizers in BiH



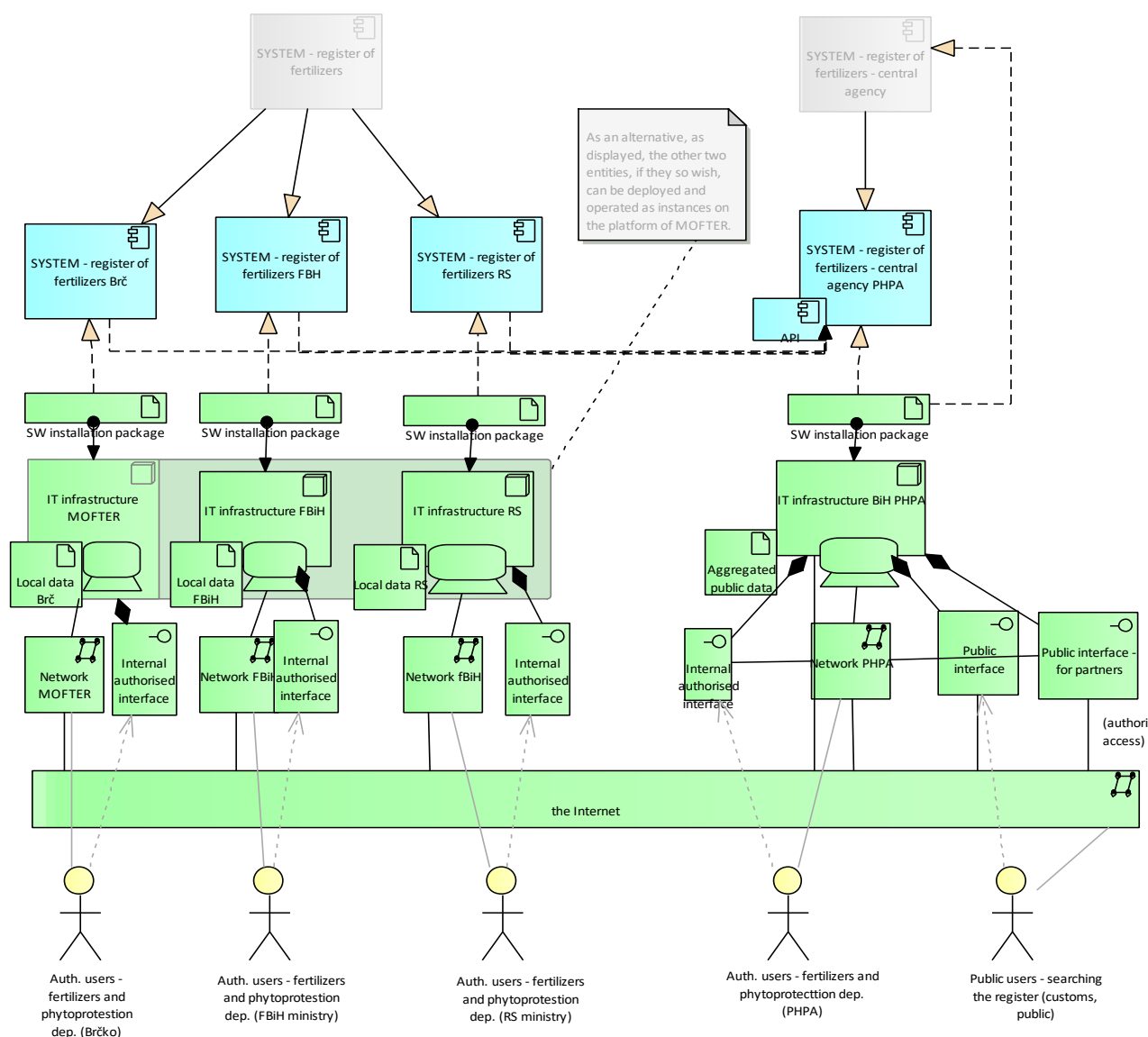
Prerequisite: Subject data list (::«ArchiMate ApplicationFunction»)	(if not part of "Search for identifying a person")
Prerequisite: Subject data update (::«ArchiMate ApplicationFunction»)	(if not part of "Search for identifying a person")
API (::«ArchiMate ApplicationComponent»)	To avoid doubt: The technological approach and methods used to fulfil the functions linked to the "API" are at sole discretion of the contractor as shall be decided during analysis and system design. (see AR013) Any automated synchronization is possible, starting from a 'simple' database replication up to complex application logic accessible through various protocol such as REST/SOAP



	with higher markup for data serializations such as but not limited to XML/JSON etc. The contractor is however advised, that not important what solution shall be chosen, the contractor is bearing the entire cost for the solution deployment completely within the originally fixed and contractually obligatory price. To avoid doubt: The "API" as depicted here is intended only for access by the other parts of the system itself.
SYSTEM - register of fertilizers (::«ArchiMate_ApplicationComponent »)	This item represents the module of the application responsible for local registries to enregister the fertilizers and their importers/suppliers.
SYSTEM - register of fertilizers - central agency (::«ArchiMate_ApplicationComponent »)	This item represents the module of the application responsible for the central aggregation of the registry.

4.3 System to-be - Deployment

4.3.1 Deployment (chosen alt. 1a) - the Locals with central over Internet





In this image we may observe following:

- 2 types of the system software - one for the "local" registration of fertilizers and the suppliers/importers and one for the aggregation and publication of the data. What each of the types of software does (= what agendas/business processes it shall support and what functions it shall provide, please refer to the previous diagram "Each site deploy in detail").
- The first type of the system software (the "local" one) is - in this alternative - installed in 3 various and independent instances, each one being run on the distinct IT (network, servers) infrastructures of the three entities (links to the green elements), where the Brčko instance shall be deployed and operated on the platform of MOFTER. As an alternative, as displayed, the other two entities, if they so wish, can be deployed and operated as instances on the platform of MOFTER
- As one may observe, the installations of the first type of software (the local) provides only an internal authorized interface, which is accessed by the employees (the "actors" - the human-like figures at the bottom of the picture) through the internal networks of the respective organizations of the entities. (Please note: Also, in this case a certain role-based access within each of the local installation is possible however it is not necessary and not distinguishable on this level of detail of the architecture).
- It is however expected, that these internal networks are interconnected with the Internet, thus being able to reach a special interface (to the most right at the bottom - the interface "for partners") of the second type of the software (the "central" one).
- The central software is installed at a fourth location (again a distinct hardware and network infrastructure) and besides its internal administration interface) it shall provide also 1. the interface for the other 3 instances of the software to communicate the data into it and 2. a public interface to present the data to the public consumers such as the customs officers, inspectors, wide public etc.

Please note: The fact, that the systems are described as "locals" here, does NOT influence their architecture.

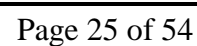
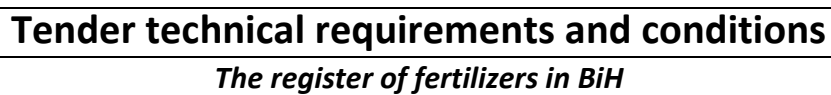
Auth. users - fertilizers and phytoprotection dep. (FBiH ministry) (::«ArchiMate_BusinessActor»)	<ul style="list-style-type: none"> ▪ Users: ▪ Resp. employees of the MfA (1-2 pers.) ▪ Inspectors ▪ Borders inspectors
Public users - searching the register (customs, public) (::«ArchiMate_BusinessActor»)	<ul style="list-style-type: none"> ▪ Consumers of the public parts of the register: ▪ Customs office inspectors ▪ The registrants / applicants ▪ Inspectors of federation ▪ PHPA
Aggregated public data (::«ArchiMate_Artifact»)	Technology artifact - represents the data storage to be deployed on the various hardware.
Local data Brč (::«ArchiMate_Artifact»)	Technology artifact - represents the data storage to be deployed on the various hardware.
Local data FBiH (::«ArchiMate_Artifact»)	Technology artifact - represents the data storage to be deployed on the various hardware.
Local data RS (::«ArchiMate_Artifact»)	Technology artifact - represents the data storage to be deployed on the various hardware.
SW installation package (::«ArchiMate_Artifact»)	Technology artifact - represents the application binaries to be deployed on the various hardware.
API (::«ArchiMate_ApplicationComponent»)	To avoid doubt: The technological approach and methods used to fulfil the functions linked to the "API" are at sole discretion of the contractor as shall be decided during analysis and system design. (see AR013)



	<p>Any automated synchronization is possible, starting from a 'simple' database replication up to complex application logic accessible through various protocol such as REST/SOAP with higher markup for data serializations such as but not limited to XML/JSON etc. The contractor is however advised, that not important what solution shall be chosen, the contractor is bearing the entire cost for the solution deployment completely within the originally fixed and contractually obligatory price.</p> <p>To avoid doubt: The "API" as depicted here is intended only for access by the other parts of the system itself.</p>
SYSTEM - register of fertilizers (::«ArchiMate_ApplicationComponent »)	This item represents the module of the application responsible for local registries to enregister the fertilizers and their importers/suppliers.
SYSTEM - register of fertilizers - central agency (::«ArchiMate_ApplicationComponent »)	This item represents the module of the application responsible for the central aggregation of the registry.

4.4 System to-be - Delivery content (incl. metamodel)

4.4.1 Documentation structure





(ALT) Process (structure and list)	<p>Containing:</p> <ul style="list-style-type: none"> Mandatory: Processes (actions/activities ... formal name depending on notation used) being supported by the SW and their respective relations (Composition/Aggregation) <p>LOD:</p> <ul style="list-style-type: none"> Up to the level of assignable user rights (assignable functions) to the respective roles in the administration. Note: Should be linkable to "Components breakdown and their functions") <p>Notation:</p> <ul style="list-style-type: none"> ArchiMate any ver - Business layer / Application layer; UML any ver: Activity diagram; Structured lists
(ALT:) Use-cases	<p>Containing:</p> <ul style="list-style-type: none"> Mandatory: User roles Mandatory: Use-cases performed by the respective roles Optional: Use-case structure ("include" etc.) <p>LOD:</p> <ul style="list-style-type: none"> Up to the level of assignable user rights (assignable functions) to the respective roles in the administration. Note: Should be linkable to "Components breakdown and their functions") <p>Notation:</p> <ul style="list-style-type: none"> pref.: UML any ver. - Use-case diagram also possible: ArchiMate any ver. Business/Application layer; Structured list.
(OPT) Functions structure	<p>The structure of functions interacting with each other and/or accessing other services.</p> <p>Containing:</p> <ul style="list-style-type: none"> Mandatory: Application Components/Services/Functions and their structure and interactions Opt.: Any other Application layer objects (concepts) <p>LOD:</p> <ul style="list-style-type: none"> no specific prefs. <p>Notation:</p> <ul style="list-style-type: none"> ArchiMate any ver. Application ev. Technology layer
Administrator (GUI) manual (BOS)	Use-case by use-case description of administrator actions and the ways of performing thereof (HOW-TOs) or the very same based on the modules and functionality tree of the software.
Administrator (GUI) manual (ENG)	Use-case by use-case description of administrator actions and the ways of performing thereof (HOW-TOs) or the very same based on the modules and functionality tree of the software.
Administrator (GUI) manual (HRV)	Use-case by use-case description of administrator actions and the ways of performing thereof (HOW-TOs) or the very same based on the modules and functionality tree of the software.
Administrator (GUI) manual (SRP)	Use-case by use-case description of administrator actions and the ways of performing thereof (HOW-TOs) or the very same based on the modules and functionality tree of the software.
API Developer documentaiton (ENG)	(no specific requirements)
Components breakdown and their functions	<p>Links of functions to their respective application modules/parts.</p> <p>Containing:</p> <ul style="list-style-type: none"> Mandatory: Application modules (structure) and their respective functions Opt.: Any other Application / Technology level objects (elements/concepts) <p>LOD:</p> <ul style="list-style-type: none"> no pref, should be linkable to either "Use-cases" or "Process (structure and list)" <p>Notation:</p> <ul style="list-style-type: none"> pref.: ArchiMate any ver. - Application layer



Tender technical requirements and conditions

The register of fertilizers in BiH



	RICH COMMENTED FOR END-USER (guarantors) SIGN-OFF, may be joined into one document / model with Interfaces layout.
Co-operation requirements	Containing required role, its description and schedule as per PC001
Data	IMPORTANT NOTE: With no prejudice to tool and notation used, however any data model featuring relations and having attributes noted within the class/entity objects (such as but not limited to: class diagram, tables and columns, RDBMs generated documentation etc.) HAS TO meet following requirement: The relation lines have to start/end (being anchored) on the line of attribute of primary or foreign key being used in that relation.
Data model (DB ERD)	Containing: <ul style="list-style-type: none">• Objects/views/procs, their attributes, constraints and relations, all with description of their meaning LOD: <ul style="list-style-type: none">• 1:1 to technological (SQL-level view) representation in the RDBMS used. Notation: <ul style="list-style-type: none">• no pref. IMPORTANT NOTE: With no prejudice to tool and notation used, however any data model featuring relations and having attributes noted within the class/entity objects (such as but not limited to: class diagram, tables and columns, RDBMs generated documentation etc.) HAS TO meet following requirement: The relation lines have to start/end (being anchored) on the line of attribute of primary or foreign key being used in that relation.
Deployment architecture	Containing: <ul style="list-style-type: none">• Architecture components representable as artefacts, e.g. packages deployable on nodes; nodes and infrastructure describing a technologically configurable environment, including network architecture + ports used between components. LOD: <ul style="list-style-type: none">• To be usable for administrators/deployment team and infrastructure opponency Notation: <ul style="list-style-type: none">• pref.: ArchiMate any ver. - Technology layer
Developer documentation (workstation setup + licenses) (ENG)	<ul style="list-style-type: none">• Development prerequisites needed for the code to be run (including 3rd party tools installers where possible or necessary from the point of view of the licensing terms) incl. processes and means of keeping track of changes and patching changes made during the warranty period.• Development environment setup guide (may include virtual machines images, services mock-ups etc., however these do not substitute the step-by-step guide)• License numbers / registration data for components that should require such a number or registration.• May contain also a cloneable virtual image of a developer workstation
Functions	The functionality of the respective modules/components of the system (ArchiMate - app layer (preferred) OR UML Component)
Interfaces layout	Interfaces layout of GUI, WSs, APIS... For webservices: <ul style="list-style-type: none">• Methods list• their I/Os attributes• exceptions. For GUI: <ul style="list-style-type: none">• rich textual description of the functionalities,• can be also provided in the form of the User / Administrator manual.• Schemas up to the detail of data attributes (depicted as input fields labels and list/table headers) and functionalities,• featuring at least one example representing also the graphical layout (template) for each type of functionality.



	RICH COMMENTED FOR END-USER (guarantors) SIGN-OFF, may be joined with Components breakdown in one document/model.
Legend: dark orange: RICH COMMENTED FOR END-USER (guarantors) SIGN-OFF	<p>Any of the dark orange elements denotes a deliverable where:</p> <ul style="list-style-type: none"> in case of a model rich textual description should be provided, enabling to deliver the information to end-user even when he or she is not familiar with the notation (e.g. typically: the diagram description should state the very same information as depicted on the diagram including not only the various objects/elements, but the description should convey also the information represented by the various relations between the objects) in case of textual documents these are to be written for non-professional end-users (in case of manuals) or non-developer/programmer users (in case of document for technological administrators) or (in case of developer/programmer documents) in a friendly and easy-to-understand way.
Logical diagram incl. attribs.	<p>Containing:</p> <ul style="list-style-type: none"> A full list of data entities existing throughout the entire system and their relations, including full list of their attributes (logical perspective, not physical) (UML class diagram). Optionally: data entities may be additionally represented multiple times with specification of variants of each used for persistence, data flow within the I/O of various interfaces etc. (for example: while a person may have the set of 20 attributes, this data entity may be represented not only as "general one" having 20 attributes, but also as a data entity of some say WS or GUI, where only 10 of the attributes are used). <p>LOD:</p> <ul style="list-style-type: none"> Data entities on logical level up to their atomic attributes, where the word "atomic" means "representable as some electronically recognized data type" <p>Notation:</p> <ul style="list-style-type: none"> pref.: UML any ver. Class diagram RICH COMMENTED FOR END-USER (guarantors) SIGN-OFF any other - Crowfoot, Coad/Yourdon, generic ERD, tables/lists... <p>IMPORTANT NOTE: With no prejudice to tool and notation used, however any data model featuring relations and having attributes noted within the class/entity objects (such as but not limited to: class diagram, tables and columns, RDBMs generated documentation etc.) HAS TO meet following requirement: The relation lines have to start/end (being anchored) on the line of attribute of primary or foreign key being used in that relation.</p>
Modules / Components / Interfaces breakdown	<p>Architecture of modules/components of the system and their relations</p> <p>Containing:</p> <ul style="list-style-type: none"> Mandatory: Components Mandatory: Composition/aggregation links Optionally: Services etc., realization/assignment and other links. <p>LOD:</p> <ul style="list-style-type: none"> Application parts(modules) up to discrete I/O sets (screens, templates, controls, reports...) See PO006 <p>Notation:</p> <ul style="list-style-type: none"> pref.: ArchiMate any ver. - Application layer alt.: UML any ver - Component diagram
OPT: Process diagrams	<p>Containing:</p> <ul style="list-style-type: none"> The processes descriptions/flows, branching, data flows <p>LOD:</p> <ul style="list-style-type: none"> no specific requirements <p>Notation:</p> <ul style="list-style-type: none"> No specific requirements, try to avoid ArchiMate business layer, rather UML Activity/Sequence/Sync diagrams or BPMN.



Requirements and changes	<p>Containing:</p> <ul style="list-style-type: none">• Mandatory: Requirements, issues and the changed/added requirements with "trace" relations in between them. <p>LOD:</p> <ul style="list-style-type: none">• All requirements/issues/changes independently on their respective LOD, <p>Notation:</p> <ul style="list-style-type: none">• SEA Requirements model
Source code documentation	<p>Source codes files / configuration projects and resources structure overview and description</p> <p>Containing:</p> <ul style="list-style-type: none">• The source code files + meta data (project files for IDE etc.) including comments• any kind of structured overview of the file's groups and their link to respective modules (architecture modules - LOD 1. in PO006)) + their inner logical program design structure (classes, object model)
Technological administrator and deployment manual (ENG)	<p>Deployment and technological architecture manual, including</p> <ol style="list-style-type: none">1. full step-by-step manual for installation of the application (including basic schemas of application layout and setup possibilities, if applicable),2. the documentation of all the configurable variables in any configuration repositories (such as but not limited to: the Microsoft Windows registry, any text/xml/csv/tabbed/json and similar files, the database, configuration repositories of any kind in any proprietary software including the RDBMS being used, templates/reports and the available variables for the report templates configuration; if a 3rd party software is used, then the documentation may be covered by the documentation of the 3rd party software itself, however an addendum has to be made about how the configuration influences the delivered software).3. Network architecture and ports used between the components (may use the "Deployment architecture" diagram)4. Backup & recovery plan containing:<ul style="list-style-type: none">• Analysis of data assets (may be part of data models)• Architecture of backup solution(s) being employed• Data assets <--> backup solution(s) (which asset is backed up by what solution and with what frequency, type of backup etc.)• Steps to check the backups being done correctly (per type of backup solution) or (should this require manual operation) the manual for performing these steps.• Steps to recover each data asset (per type of backup solution)
Test cases	<ul style="list-style-type: none">• All tests/test cases have to reference either a requirement specified already in this Contract/Tender documents or a requirement provided during the analysis. One requirement may result in multiple tests, and one test may cover multiple requirements, if necessary (e.g. the level-of-detail should provide at least such a detail, that each test-case belongs to each function/requirement or small groups thereof). (Note: this does not apply, if necessary, for the "global" (non-functional) requirements, which may be tested either<ol style="list-style-type: none">1. within another test case (but this has to be stated as a requirement being tested by the test)2. separately within an acceptance test or3. within a test without a scenario: a mere "statement" test, such as "according to chapter XYZ in the documentation the application has 3 tires" or "(...) the system has a software application with functionalities covering each of the 3 modules")• Each test has to provide a step-by-step manual for performing the relevant test, including all input values and expected outputs.• If a test may fork into multiple variants based on the data input, all possible inputs (or at least their groups – classes of values) have to be tested.



	<ul style="list-style-type: none">• Each test case (especially in the printed version being used as annex for the acceptance M2) has to provide free space, where the result and final resolution (passed/failed with objections/failed) can be noted.• The test cases are to be described in English language (except the labels/buttons/software I/O texts and data I/O).• The first testing will be done by the contractor, but the test scenarios will be accessible and the second times run by the PHPA or departments or UKZUZ as selected during the acceptance procedure. <p>The above mentioned does not intend to influence nor it may not replace any internal testing procedures of the contractor.</p>
User manual (BOS)	Use-case by use-case description of actions and the ways of performing thereof (HOW-TOs) or the very same based on the modules and functionality tree of the software.
User manual (ENG)	Use-case by use-case description of actions and the ways of performing thereof (HOW-TOs) or the very same based on the modules and functionality tree of the software.
User manual (HRV)	Use-case by use-case description of actions and the ways of performing thereof (HOW-TOs) or the very same based on the modules and functionality tree of the software.
User manual (SRP)	Use-case by use-case description of actions and the ways of performing thereof (HOW-TOs) or the very same based on the modules and functionality tree of the software.
Users/roles	<p>Structure of the organization affected and the resulting software roles.</p> <p>Containing:</p> <ul style="list-style-type: none">• Mandatory: Independently on independently on their LOD, entire list of roles (and their permitted functionalities - see Use-cases/Processes) must be present <p>LOD:</p> <ul style="list-style-type: none">• Up to roles (and their assignable functions - see Use-cases/Processes) that shall be set up in the software. <p>Notation:</p> <ul style="list-style-type: none">• pref.: ArchiMate any ver. Business layer• also possible: UML - Use-case any ver.; Structured list.

4.5 System to-be - Requirements catalogue

This part of the documentation is the main catalogue holding the list of requirements as specified for the various parts of the system. These requirements are of three main categories:

- Functional requirements - describing the required functional aspects of the system in regard to the processes or agendas the system shall be supporting.
- Non-functional requirements - all other "general" constraints of the system that the system should follow and respect in all its parts.
- Other requirements - dealing rather with the project-based issues, such as requirements for project management, documentation outputs and structure, testing requirements etc. If necessary, the respective parts describing each of the requirements in detail may be found in separate parts of the documentation, or (if not too many), directly within the requirements catalogue.

Note: Functional requirements for shared parts of the system, that, while being functional ones, however should be valid throughout the entire system are usually parts either of "Architectural requirements" (if concerning management, installation, setup or configuration properties of the system) or "Interfaces requirements" (if concerning typically GUI parts or interfaces concepts valid in all of them such as headers/envelopes etc.).



Please note following important contractual statement: THIS CATALOGUE REPRESENTS THE ONLY AND ENTIRE CONTRACTUALLY BINDING SET OF REQUIREMENTS. THE CONTENT OF PREVIOUS SET OF DIAGRAMS IS CONSIDERED to be rather informative for the contractor in order to gain a faster, better and more comprehensive overview of the ordered system-to-be, yet the diagrams are considered as CONTRACTUALLY BINDING ONLY IN THOSE CASES, WHEN THEY ENUMERATE OR STRUCTURE ANY INFORMATION DIRECTLY OR INDIRECTLY REFERRED FROM WITHIN THE REQUIREMENTS CATALOGUE.

4.5.1 Requirements catalogue - Functional requirements

This part of the documentation describes the required functional aspects of the system in regard to the processes or agendas the system shall be supporting.

While one may observe the processes and their order, bindings and logical dependency in the appropriate documentation parts, here the requirements are merely a list of these processes or sub-processes, to ensure their implementation according the abovementioned specification.

4.5.1.1 Functional requirements - General - applications

FR0001	FR001 Applications register (receiving, storage and search/review)
<p>The system shall allow general recording, evidence and search of documents, that means:</p> <ul style="list-style-type: none">• Their search• Their list with actions (adding, editing)• Editing of (replacing the file, editing metadata)• Appending file(s) to document• Using within given existing or newly created subject registration, fertilizers registration• Opening (downloading) the documents associated (may also include mechanisms of downloading a temporary file into a specified location, tracking its changes and automatic re-uploading as new version back into the system, if required by any of the contractual parties) <p>To avoid doubt: The documents are an independent sub-register of the register, since a document may exist without any other entity being associated to it (for example denied applications).</p>	

4.5.1.2 Functional requirements - Subjects holding fertilizers registration

FR0002	FR002 Subject registration and editing (+list and search)
<p>When considering the registered subjects, it must be possible to:</p> <ul style="list-style-type: none">• Create new registration (while checking for any previous registrations, also those that may have been synced from the other entities (=instances)!) including identifying and eventually pairing of the person from Phyto register.• Edit a subject's registration (checking for registration from other entities as well) including 1. manual update of the data from the Phyto register, 2. associating with a subject from Phyto register 3. marking data attributes as non-updatable 4. reflecting a subject merge (rectification of a situation when a subject has been recorded as two different ones, one being suspended and other being associated with both subjects from Phyto register or a single one, including registered fertilizers transfer), 5. reflecting a subject split (when two subjects have been recorded as one, so creating a new one, moving part of the fertilizers registration to one of them, associating the both subjects with the one or with both in the Phyto register).• Suspend/cancel the registration,• Delete the subject• Search the subjects (based on criteria detailed during the analysis)• List the found subjects (listing attributes (=columns) as per analysis), incl. the mode when the list is showing recent synchronization problems (subjects with sync. errors) to be resolved by the operator	



When the data is checked in the central register, the system must display errors of data:

- being marked as invalid.
- attributes not obtained
- subjects merged/split (in case of split the operator must decide what subject he refers to; the other one shall be synchronised automatically)

FR0003

FR003 Subject registration certificate (rešenje) output

Creating of 'rjesenje' (editable in a word processor later) incl. adding of the generated certificate to the collection of documents of the specific subject.

FR0004

FR004 Subject registration publication (transmit to PHPA & sync)

Synchronization of the newly created/edited subject to the central part of the system (PHPA) used for publication.

The system must display errors of data:

- being marked as invalid
- being marked as protected
- subjects merged/split (in case of split the operator must decide what subject he refers to; the other one shall be synchronised automatically)

FR0005

FR005 Subject stock evidence records

As part of the information the subject's stock report may be added and recorded. This may be also a single document without metadata or a more complicated structure, as per analysis.

The requirement is, that this type of information must not be synchronized, as long when only a single entity shall use this feature.

4.5.1.3 Functional requirements - Fertilizers registration

FR0006

FR006 Fertilizer registration and editing (+list and search)

When considering the registered fertilizers, it must be possible to:

- Create new registration (while checking for any previous registrations, also those that may have been synced from the other entities!)
- Edit a fertilizer's registration (checking for registration from other entities as well)
- Suspend/cancel the registration
- Delete the fertilizer
- Search the fertilizers (based on criteria detailed during the analysis)
- List the found fertilizers (listing attributes (=columns) as per analysis), incl. the mode when the list is showing recent synchronization problems (subjects with sync. errors) to be resolved by the operator

When the data is checked in the central register, the system must display errors of data:

- being marked as invalid.
- attributes not obtained
- fertilizers merged/split (in case of split the operator must decide what subject he refers to; the other one shall be synchronised automatically)

FR0007

FR007 Fertilizer registration certificate (rešenje) output

Creating of 'rjesenje' (editable in a word processor later) incl. adding of the generated certificate to the collection of documents of the specific fertilizers.

FR0008

FR008 Fertilizer registration publication (transmit to PHPA & sync)

Synchronization of the newly created/edited fertilizers to the central part of the system (PHPA) used for publication.

The system must display errors of data:

- being marked as invalid



- being marked as protected
- being merged/split (in case of split the operator must decide what subject he refers to; the other one shall be synchronised automatically)

FR0009**FR009 Fertilizers stock evidence records display**

If the subject's stock report is a more complicated structure, making it possible to aggregate the stock on the "per fertilizers" basis, then the aggregated stock reports for the specific fertilizers shall be displayed., as per requirements emerging from the contractor's analysis.

The requirement is, that this type of information must not be synchronized (or refreshed before displaying), as long when only a single entity shall use this feature.

4.5.1.4 Functional requirements - Registrations publications

FR0010**FR0010 Registration exchange**

The central part of the system has to ensure the exchange of information about:

- registered subjects,
- registered fertilizers
- (opt) subject's last year's stock

in both directions (from the instance of the system = publishing, to the system = synchronization of published registrations from other instances), this includes also operations to handle administration interventions (split, merge of registered subjects/fertilizers, metadata correction) done as per FR0012

FR0011**FR0011 Registration review**

The system must enable the operation of reviewing of the registered subjects/fertilizers before publishing, however the subjects/fertilizers may be published without review too (as per system setting).

FR0012**FR0012 Registration edit**

The administrator, reviewing the registered subjects/fertilizers makes use of:

- Search and list (as per FR0013)
- Disabling/Enabling of publication of the subject/fertilizer (to be found on the public list)
- Disabling/Enabling of the synchronization of the subject/fertilizer (it is not returned to the specified system instance, or some of the data are marked as "invalid" or not returned at all)
- Disabling/Enabling of the change of the subject/fertilizer by publishing from the specified system instance, or some of the data are marked as "protected" against such publication authorization)

FR0013**FR0013 Public registration search and list**

The public portion of the system shall make certain data available to the anonymous public access showing:

- selected data (list) of registered subjects
- selected data (list) of registered fertilizers.

4.5.1.5 Functional requirements - General - entire software

FR0014**FR0014 General sync (without publication of new)**

The synchronization must also be performed due to an automatic / scheduled event, without the event of publication of new subject, its editing or search.

The unavailability of the central part of the system must not prevent any of the "local" operations.

FR0015**FR0015 Addresses**

When the attribute is any geographical address, this should be input using a selector from an internal addresses register. The editing (adding new address records or changing it attributes, as well deleting) of the addresses register has to be enabled.



FR0016	FR0016 Entities from 3rd party - only download and prefill
Subjects data being entered (introduced) into the system may be prefilled (in GUI, no other type of integration) from the justice register.	
FR0018	FR0017 Data entities
The terms in the various functional requirements and function descriptions refer to the data entities as specified in the "Data drafts (logical classes)" diagrams. Nevertheless, it is up to the contractor to re-specify and refine this specification as necessary.	

4.5.1.6 Functional requirements - Administration

FR0019	FR0019 Administration
The system shall have a GUI part accessible for administrators of the system only, used to maintain: <ul style="list-style-type: none">the integrity and purity of the recordsediting of enumerations and other registry listsediting of the register of addresses; based on the IR001 may also include the administration of updates/data batch imports from the Statistical agency.(RS) editing of AAA settings (roles (=MS AD groups) assignment to their rights (=functions within the system); roles creation and user account assignments into roles if the access to the respective MS AD OUs permit)(FBiH/Brč) editing of local (system internal) AAA settings (roles assignment to their rights (=functions within the system); roles creation and user account assignments into roles; users creating/deleting/edit)	

4.5.1.7 Functional requirements - Automated subjects update

FR0020	FR0020 Update of changed data inPhyto register
The system has to check subjects (those, which were associated with their counterparts in Phyto register) for data changes/updates in the Phyto register (including the merger and split of subjects!) regularly.	
FR0022	FR0021 Ex-post association
The system shall try to associate those subjects from register of fertilizers, that have not been associated with Phyto register subjects, with their Phyto register counterparts.	

4.5.2 Requirements catalogue - Non-functional requirements

This part of the documentation specifies all other "general" constraints of the system, that the system should follow and respect in all its parts.

4.5.2.1 Non-functional requirements - Architecture (AR)

These requirements specify those needs that are somehow limiting or specifically asking for a concrete design of the modules and their interconnections of the system at various levels of its architecture (SW, HW and even orgware if necessary).

Detailed concepts of the architecture may be specified in separate diagrams in the appropriate parts of the documentation if necessary.

AR001	AR001 Modularity and scalability
Any platform used for any layer/part of the system should provide possibility of	



- horizontal scalability (increasing performance and/or availability by adding nodes of the same purpose and functionality on the same "level" or "layer")
- vertical scalability (increasing performance and/or availability by splitting the operation into multiple nodes one dependent on the services on another; note: this includes but is not limited to techniques such as ORMs, microservices, correct usage of object-oriented architecture design patterns etc. where considered appropriate by the contractor)

the abovementioned done either by design of the platform itself or by design of the system being implemented on it.

The design of the system should provide reasonable level of modularity one may expect, done mainly by architecture design, especially but not limited to techniques such as:

- the minimizing of in-between entities/libraries/modules/parts relations and dependencies
- clean and documented dependency tree or graph (see Documentation requirements)
- design patterns and proper using of interfaces, inheritance and other means of correct object-oriented design
- etc.

AR002	AR002 Architecture layers
<ul style="list-style-type: none"> • The system shall provide its functionalities using internal webservices, which shall be consumed by most of the GUI functions or external GUI or WS functions. Some GUI functions (administrative ones) may work directly with the database RDBMS or LDAP. • The presentation layer shall be separated from the application/RDBMS layer as much as possible and as expected by best practices. • The internal implementation of presentation layer, if dependent/generated on application layer, shall preferably make use of the MVC-based techniques and frameworks. 	

AR003	AR003 Platform and RDBMS
<p>As required per IT strategy of the Bosna and Hercegovina, the server-side components must be Microsoft based technologies:</p> <ul style="list-style-type: none"> • MS-SQL as RDBMS • IIS/ASP.NET for the GUI/WS (server-side application layer) • Microsoft Windows services for daemons (may launch other binaries/interpreters) <p>Client components (if used depending on the User interface requirements) shall be compatible and fully working on Microsoft Windows 7 32/64bit (any language version!) and above.</p> <p>Should any other RDBMS be used (as supporting only! and in accordance with the AR009), than the architecture of the data tier/layer (data storage, database) is to be designed in such a fashion that allows later usage of any data mining / warehousing / business intelligence tools by the customer (does not mean instant usage, some DWH construction/pumps etc. is to be done, of course). These DWH tools are not required to be a part of the delivery of the project, however if any other data storage then a generally recognized RDBMS is proposed, the contractor has to provide information about the possibility of usage of data mining / warehousing / business intelligence tools above such a RDBMS.</p> <p>A generally recognized RDBMS = any RDBM that:</p> <ul style="list-style-type: none"> • is accessible using the standard queries of SQL language on any kind of abstraction layer of data in tables having columns (attributes) with the possibility of relations between them • is accessible through a network service above TCP/IP level having also its ODBC interface implementation. 	

AR004	AR004 Hyper-V compatibility
Any used or delivered binary must be Hyper-V platform compatible (in the means of any server-side component running in virtualized OSes).	

AR005	AR005 Provided interface
All the WS functions specified in this document and/or specified later by the detailed analysis done by the contractor have to be made publicly available, if presented as part of the public WS.	

AR006	AR006 Operation environment architecture
The system should be set up according to given requirements and conditions as specified during analysis, respecting the deployment diagrams in this document (where the analysis requests should prevail), and that in at least 2 environments:	



- testing environment (does not meet response-time requirements as specified, with exception of those moments, when such acceptance tests are to be performed, that are measuring the performance)
- production environment (that has to meet response time as specified in appropriate requirement)

During the development of the system, the environments shall be regarded as follows:

From beginning of the project up to M2

- the testing environment: won't exist
- the production environment: will be called "M2 testing environment" and is to be used by the contracting authorities for testing purposes – the acceptance tests will be based on the performance and behaviour of the application being tested on this environment. Up to M2 (or any other moment, when production data shall be filled or the connectivity to production registers established) the contractor shall have free access to the "M2 testing environment", after the M2 (or any later moment as described above) the testing environment shall be converted to "production environment" and the access of the contractor may be limited

After the M2 (or any later moment as described above):

- the (newly created) testing environment is to be used for acceptance tests as described above (incl. performance tests, for this, the testing environment virtual infrastructure configuration may be temporally matched to the configuration of the production environment, where the licenses and the required resources configuration have to cover this scenario), while a second instance of the application (or a third, fourth...) for development purposes is possible, if allowed by the application system being used by the contractor and/or as far covered by the licenses, for example those that have been calculated for the coverage of the performance tests (this means also separate virtual servers, if necessary, however sharing the same resources as the rest of the testing environment)
- production environment: shall be already used as described in the project schedule, may be without the possible direct access by the contractor.

Note: The term "environment" may refer either to a virtual infrastructure (Infrastructure as a Service, provided within the infrastructure of any entity in BiH) or any other instance (tenant) of the platform services of the platforms forming the BiH platform(s).

AR007	AR007 Network protocols
<ul style="list-style-type: none"> • Every part (of the client application) that is connecting to the application server is to employ secure protocols running on the top of the standard TCP/IP protocols (e.g. is user-friendly securable by certificates and/or means of asymmetric cryptography, routable, VPN tunnel-able etc.). Should any other network/transport/connection/relational/presentation protocol be employed, it has to meet the requirements specified by the features of the TCP/IP stack or these features have to be ensured programmatically within higher levels of protocols including the application one (if possible by the specification of the app. protocol, if not, such protocol cannot be used as substitute for the requirements above)) 	

AR008	AR008 Connection reliability
Client - Server connection must not rely on stable network connections (especially in case of dial-up VPNs).	

AR009	AR009 Software licenses
<p>Should the solution proposed by the candidate require any licenses, these licenses have to be calculated within the delivery price and provided as a part of the project, with exception:</p> <ul style="list-style-type: none"> • Microsoft Server 2008 R2/2012 R2 • MS SQL 2008 Standard <p>the licenses mentioned above are to be specified with respect to hardware limitations of each of the entity.</p> <p>For any other licenses following shall apply:</p> <ul style="list-style-type: none"> • The licenses calculated and provided within the delivery have to have NO limitation when regarding the migration on different hardware, since this process is under automatic control of the underlying virtualization platform. • These licenses provided have to be life-longs. Should they have a validity period specified (such as maintenance/assurance or extended support), then it is understood, that the calculation for a license provided within the delivery has to cover at least the entire time frame of the project, including the warranty period and + 1 year afterwards. If there is such a license, then this license has to be enlisted separately in the proposal and in the contract including its complete (commercial) specification. • If any of the licenses is not a life-long licence, then the candidate has to provide also the list and costs for further maintenance/renewal of the license for 2 years period (based on the current prices, as if the license renewal/maintenance would be purchased (directly from producer or for a price not lower or higher as recommended by the producer) to the date within one month before the proposal without any specific promotional 	



and other similar benefits). This applies also for the licenses for developers (libraries, third party tools, VDEs etc.) needed.

- The licenses have to be able to cover the requirements of both environments in accordance with requirement "Operation environment architecture".

AR010

AR010 Software licensing

The entire solution being part of the delivery is foreseeing the handover of the license for any kind of use to the final user of the software (the government of Bosna and Hercegovina, its entities and their respective agencies). Thus:

- any tool necessary for the development and/or build or deployment of the solution has to meet requirements as specified in AR009
- AND the output of the work of the contractor that might form a licensable piece of work must be licensed to the final user.

AR011

AR011 Backup solution

Backup: The provided infrastructure does not provide any other means for backup. It is solely the responsibility of the contractor, to provide a solution for:

- backing up of the entire data and application space of the system in such a manner that a restoration by administrator/IT administrator within 24 hours of time is possible,
- and propose a system of types and scheduling of backups of data assets of the system as part of the "Analysis and system design document" including the provision of the necessary tools (and their licenses) as part of the delivery.

RTO (time needed for recovery of services after disruption) - application&DB: < 1 business day

RPO (time of maximum data loss - longest time between backups) - DB: 2 hours

AR0012

AR012 Entity unique identification decentralization

The system must enable the operation of multiple instances of itself being able to synchronize all entities, sub-entities and their attributes (as required and described per FRs) across all the instances through the central point.

A unique, decentralised identification of the entities is therefore required; however, it must provide also the possibility for user-friendly IDs of any format *)

The central part of the software must allow to be set up as standalone or may be set-up as part of installation of any of its instances providing the other functionalities.

*) Authors note to avoid any doubt: While it is not forbidden nor discouraged to rely on techniques such as UUID/GUID and/or similar approaches, the user should not be bothered by their usage in daily operation, so the user-side IDs should use a different suitable format.

AR013

AR013 Synchronization techniques

The technology for the synchronization and publishing as mentioned in FR0002, FR0004, FR0006, FR0008 is up to the discretion of the contractor (such as but not limited to: application synchronization, database level synchronization etc.).

4.5.2.2 Non-functional requirements - Integration (IR)

These requirements specify the list of other parts/systems that the application(s) should integrate with. If this integration is not only process-based, but also software based, then the appropriate architectural concepts and/or interfaces specifications can be found in the appropriate part of the documentation.

The information space of Register of fertilizers is required to rely on interaction with automated information systems, which form the following information resources:

IR001

IR001 Addresses register

If it shall be possible, the internal register addresses shall draw its data from the Statistic agency.

IR002

IR002 MS AD LDAP (RS mandatory, FBiH/Brčko optionally)

Microsoft Active directory LDAP:

- For authentication of users accessing the register



- For download of respective groups the user is part of
- For creating/deleting/renaming the MS AD groups (in specified OU) from within the administration GUI of the register.

IR003

IR003 Phytoregister (RS/FBiH/Brčko/PHPA)

Phytoregister (existing register already running on the various sites) internal:

- For synchronization of users being then authenticated within the register of fertilizers (for RS/FBiH/Brčko)

IR004

IR004 Means of access

The external systems will be accessible using methods according to documentation given to the contractor after signing of the contract and relevant documents and use them in scenarios as defined above and/or during detailed analysis.

The scenarios may include not only basic / automated / batch identification and data completion on the subjects/entities, but also automatic updates, resulting integrity cross-checks and warnings etc. based on the use-cases of the respective registers and their possibilities/requirements.

IR005

IR005 Integration fall-back

If any of the (integrated) registers should not perform according to requirements needed by the register of fertilizers, following measures are to be taken by the contractor and other parties involved (one after another or in parallel, as the situation requires):

- Specification of the under-performing system and negotiation for diagnosing bottlenecks and other issues in the implementation or in the underlying infrastructure that might cause the problems. For this negotiation the presence (preferably on-site) of the contractor is required.
- Rectification of the state using optimization on the side of the register of fertilizers (such as for example but not limited to asynchronous calling with the possibility of listing the tasks for (user) reaction on the returned asynchronous calls, limitation of the minimal set or range of input parameters etc.)
- Rectification of the state using batch processing (again with user-accessible lists of errors / ambivalences to be decided/fixed) and/or the possibility to input these values as “text-only” (without the synchronous verification on the respective register)
- Cancelling of the integration of register with the respective external register – as a written amendment to the contract only – including the delivery of any changes needed to ensure the operation of the system according to all other specification within the scope and original budget of the project up to a degree the contractor can be fairly asked.

4.5.2.3 Non-functional requirements - Interfaces (GUI/WS..) and user requirements (UR)

These are general requirements for the structure and layout of the interfaces the software shall be employing to communicate with its outer world, including the users.

UR001

UR001 Web application

- For any parts/modules used by more than 3 users or more than 2 users on geographically distant location or more than 2 users in different organization or environments it is required, that the client application is a web application (providing a web interface to the users)

(Note: The client-side application MAY contain any security/validation and other relevant business-functionalities especially for interactivity reasons, provided that the very same are being employed on the server side.)

UR002

UR002 Supported browsers

Supported browsers shall be:

- IE/Edge or their successors

(all in current version and one previous major version, as long as supported by the manufacturer to the date of M2/M3).

UR003

UR003 Multiple instance

The software should allow for each user to open and run more the one instance, without the instances interfering with each other.



UR004	UR004 Multilingualism
<p>The system, including the prototype/pilot/testing semi-products, delivered at any stage of the project, has to have a bi-lingual user interface (implemented in a manner allowing easy localization of UI texts into next language (XML, DLL...)).</p> <p>The minimum required languages for the delivery shall be featuring:</p> <ul style="list-style-type: none">• "English" (script: Latin)• "Bosnian" (script: Latin/Cyrillic)• "Croatian" (script: Latin)• and "Serbian" (script: Latin/Cyrillic) <p>version of all descriptions, labels, short texts and context help tooltips (mock-up prototype delivered by M1 may be in English only), this also applies for selection lists, all above (in "Bosnian" and "Serbian") able to feature both scripts (Latin/Cyrillic).</p>	
UR005	UR005 Autocompleting
<p>Any value being edited that is based on an enumeration list has to provide an auto-completion feature when being edited in a graphical user interface.</p>	
UR006	UR006 Display size and resolution - workstation screens optimization
<p>The GUI has to be fully working (e.g. fully visible without horizontal scrolling (unless necessary as given by functional requirements) and/or any kind of additional magnification and/or objects layering/overlapping and design-responsive to any resolutions as stated here) on the monitors of client PC workstations:</p> <ul style="list-style-type: none">• Physical screen sizes: 15" and above• Resolution: starting at 1024px horizontally and 768px vertically.• Aspect ratios: 4:3, 16:9, 16:10, 1:1, 3:4, 9:16 and 10:16	
UR007	UR007 Credits
<p>The logo of the "Czech development agency" has to be visible on all GUI input screens (excl. dialogues; it may be placed in header or footer), on at least ~6% of surface of splash screens/title pages/graphical materials and at least ~4% of documents accompanying the software, all of them in accordance to the „Graphical manual“ as published on the http://www.czechaid.cz/wp-content/uploads/2016/09/Graficky-manual-CR-pomaha-a-loga.zip</p>	
UR008	UR008 Externally loaded 3rd party references
<p>When the application uses any 3rd party components, such as but not limited to cascading style sheets, scripts, fonts, images etc. then these have to be bundled together on the same installed instance provider as the application. Referencing from 3rd party external sources is not permitted. The bundled components have to allow such bundling and redistribution within their license.</p>	

4.5.2.4 Non-functional requirements - Performance (PR)

List of required performance measures.

PR001	PR001 Number of users
<p>Expected no. of concurrent users:</p> <ul style="list-style-type: none">• internal max 5 per instance, does not apply for the public version	
PR002	PR002 Number of workstations
<p>PCs that could be eligible to run the system:</p> <ul style="list-style-type: none">• internal users: 500pcs+.• external users: any	
PR003	PR003 Network bandwidth usage
<ul style="list-style-type: none">• Working without any uncomfortable delay (see "Response time") on ADSL lines from 1MBit (latencies may exceed 200ms) download upwards up 4MBit (60% of clients may reach the highest theoretical download speed;) (This delay should be solved also for including documents (files) uploads - implemented as non-blocking asynchronous GUI background batch tasks if necessary.)	



PR004	PR004 Response time
<ul style="list-style-type: none"> It is required, that the software response to the user actions is immediate (= such a short time, that an average human cannot tell the time period, thus under approx. 40 msec). The response for a user action requiring any data loading (does not apply for enumerations that can be reasonable preloaded) shall be either within 3 seconds (incl. GUI rendering, excl. those factors the contractor objectively could not influence in a direct or indirect manner) or has to be followed by a blocking waiting dialog with cancellation possibility or implemented as a non-blocking batch system with possibility (GUI) of management of the tasks in a cue. Any process/action/requirement resulting in processing time longer than tens of seconds (e.g. 1-2 minutes or more, such as report generating) has to be defined and implemented as an automated batch process with a GUI enabling the user control of the queue (manual start, scheduling, log/output lists for obtaining the results (if not agreed otherwise) and a list of running batches with the possibility of termination), as proposed and agreed in the "Analysis and system design documentation". This does not necessarily apply for reports where appropriate. 	

4.5.2.5 Non-functional requirements - Security (SR)

What threats and risks should the system address and how, including ACLs etc.

SR001	SR001 Information integrity and authenticity
<p>The requirement of information integrity means a condition of data, when they preserve their content ensuring its expected level of integrity, accessibility and efficiency and are interpreted unambiguously despite of- and protected from- unpredictable influences causing their loss, denaturation, distortion and unauthorized use, where and up to the extent the contractor may be held liable for (esp. but not limited to the design of transactions, data manipulation, storage and backup solutions and their configuration design and operation during any kind of maintenance tasks).</p> <p>The requirement of information veracity is the degree of data compliance of data stored in computer memory to the actual condition of the objects in a specific area of the system that they represent. This means especially the fact that the system has to ensure not to distort and/or omit/loose data being committed into it without corresponding reporting of the error or condition preventing to keep the data authenticity.</p>	
SR002	SR002 Information confidentiality & non-repudiation.
<p>Means the system has to be designed in such a way that it is providing means and resources for:</p> <ul style="list-style-type: none"> enabling the personal liability (under the laws in force) of employees working in the system for unauthorized use and dissemination of personified confidential information (e.g. access control, logging) and preventing them to extent or execute their authorization beyond its original designation. 	
SR003	SR003 AAA
<p>Authentication and authorization of the system shall be done against</p> <ul style="list-style-type: none"> RS: MS AD mandatory; FBiH/Brčko: Internal database of users, however the users have to be integrated with the current Phytoregister (see IR003) (optionally: with MS AD) PHPA: Internal database of users. (optionally MS AD/Phyto register) 	
SR004	SR004 Authorization groups
<p>Groups aggregating the various register functionalities (allowed for the specified group) shall be mirrored and created in the respective MS AD OU (RS).</p> <p>Groups into the Phytoregister shall not be synchronised.</p>	
SR005	SR005 Data record access management
<p>All records have to be accessible only based on the organizational structure that means, that any operator may see only those records created (and "owned") by him, his colleagues from the same department or of his subordinate departments, if not specified otherwise for his/her user-role.</p>	
SR006	SR006 Network-level security prerequisites expectations



The application might not be set up in any secure and consistent enterprise environment (the operators for the various organizations may not be using any kind of unified infrastructure) – this applies also for example to the local storage of configuration (if applicable) of the client application etc.

The public part of the application may be set up against the open public non-restricted access network (on technological level) thus any part of the application reachable before and also after performing authentication has to be secured against all known attacks against- and weaknesses of- all the platform whose services are exposed to the public, directly or indirectly. A suitable segregation of the computing nodes (DMZs, multi-layer networks separated by FWs etc.) should be done where appropriate (especially when protecting either personal/user data and those data entities/attributes that form the meaningful information the register is about to supervise/authorise).

4.5.2.6 Non-functional requirements - Operation and maintenance (OR)

These requirements specify what limitations and constraints the system should respect concerning its further operation and maintenance. This includes but is not limited to:

- warranty terms
- SLAs
- administration/configuration files/possibilities
- etc.

OR001	OR001 Operating environment
<p>The contractor is obliged to use the platform (Infrastructure as a service) of virtual servers provided by the</p> <ul style="list-style-type: none">• Virtual platform in RS• Virtual platform in FBiH• Physical/Virtual platform in PHPA <p>and integrate into them as required by the platform and its operators.</p> <p>Preliminary structure of the deployment may be observable from the deployment diagram above.</p>	
OR002	OR002 Network architecture
<p>All inner functions of the software shall be accessible through the internal network.</p> <p>Outer functions (cross-instance between the instance and central publishing part) shall be accessible either through public Internet or through VPN.</p>	
OR003	OR003 Required HW resources specification
<p>The contractor has to specify (for those solutions, that should rely on the Infrastructure as a Service) the required hardware and OS platform resources:</p> <ul style="list-style-type: none">• as part of the tender proposal• as part of the “Analysis and system design document” at M1• with latest update 1 calendar year before production environment start planned in the schedule• It is expected, that the specification gives the total amount of servers/CPU/RAM/storage and their respective breakdown on single servers.• The contractor is entitled to require any changes to his virtual data centre at any time provided it does not exceed the total amount of resources reserved and the frequency rate of such changes remains in a reasonable limit per month.• The required configuration of resources has to be able to cover the requirements of both environments in accordance with Operation environment architecture requirement. <p>There are following maximum limitations on the hardware resources required by the contractor:</p> <ul style="list-style-type: none">• RS/FBiH (per each entity): 6 cores, 12GB RAM, keeping the number of discrete OS/virtual machines at a reasonable minimum.	
OR004	OR004 SLA
<p>This contract does not expect any operation; thus, it does not define any SLAs with the exception of warranty SLA.</p>	
OR005	OR005 Warranty SLA
<p>(See linked document)</p>	



OR006	OR006 After-warranty support
1 year after the end of warranty period a free support for the BiH programmers shall be present (remote only).	

OR005 Warranty SLA

During the warranty period, the contractor is obliged to provide solutions in following time frames:

Error grade	Reaction time (using el. communication)	Commence of rectification - a. event occ.:	Solution time (or providing a temporary solution) - after event occurrence:
A	4 hours	<i>not specified</i>	1* working day (8 working hours)
B	4 hours	<i>not specified</i>	5 working days or longer, if agreed by the contracting authority
C	4 hours	<i>not specified</i>	10 working days or longer, if agreed by the contracting authority

Error grade “A” means such an error that halts the operation of the system completely or prevents the execution of any of the key processes (use-cases) of the system within any step of these processes. A temporary solution of an A-grade error is regarded as a (reported) B-grade error.

Error grade “B” means such an error that either allows the operation of the system however with difficulties or using alternate or more complicated methods/approaches or prevents the execution of support processes (use-cases) within any step of these processes.

When a B-grade error preventing the execution of typically administrative processes results in the impossibility of execution of any of the key processes by any party, it is regarded as an A-grade error.

A temporary solution of a B-grade error is regarded as a (reported) C-grade error.

Error grade “C” means any other errors or the claiming of other agreed and not delivered features etc.

*) Even in case that an error may require the physical presence of the contractor's representative on-site, these times may be not prolonged unless agreed in advance as a contract amendment.

4.5.3 Requirements catalogue - Other (software) requirements

The project-based requirements.

4.5.3.1 Other (software) requirements - Software legal requirements (LR)

LR001	LR001 Legitimacy and respect for human rights
The creation and operation of the system should be in accordance with the national and European legislation (specifically as enlisted in respective requirements below), international treaties and agreements, where and up to the extent the contractor may be held liable (specially concerning design and the execution of functionality of the system).	



LR002	LR002 Control
Stands for the system's ability to support and provide means for the totality of organizational and technical measures for the system, ensuring high quality of state information resources, high reliability and correctness of their use in accordance with the law and ensuring operational and convenient access to information for the user, according to its access level;	
LR003	LR003 State identification of objects (persons) of registration
It is required, that the system fully supports the state identification of objects of registration, which provides for existence of a single identification index for each of them (if not required otherwise by respective exceptions as defined in the functional requirements).	
LR004	LR004 Applicable law
Especially following laws shall be considered: <ul style="list-style-type: none">• EU Regulation 2003/2003• Law no.: 24/12• Law on Mineral Fertilizers BiH OG 46/04, 76/11• Zakon of uproavno postupku 2/98 and 48/99	

4.5.3.2 Other (software) requirements - Testing requirements (TR)

How (using what tools and techniques and what processes and organization) shall the resulting product be tested. May also contain acceptance criteria as whole.

	TR001 Test cases requirements
<ul style="list-style-type: none">• All tests/test cases have to reference either a requirement specified already in this Contract/Tender documents or a requirement provided during the analysis. One requirement may result in multiple tests, and one test may cover multiple requirements, if necessary (e.g. the level-of-detail should provide at least such a detail, that each test-case belongs to each function/requirement or small groups thereof). (Note: this does not apply, if necessary, for the “global” (non-functional) requirements, which may be tested either<ol style="list-style-type: none">1. within another test case (but this has to be stated as a requirement being tested by the test)2. separately within an acceptance test or3. within a test without a scenario: a mere “statement” test, such as “according to chapter XYZ in the documentation the application has 3 tires” or “(...) the system has a software application with functionalities covering each of the 3 modules”)• Each test has to provide a step-by-step manual for performing the relevant test, including all input values and expected outputs.• If a test may fork into multiple variants based on the data input, all possible inputs (or at least their groups – classes of values) have to be tested.• Each test case (especially in the printed version being used as annex for the acceptance M2) has to provide free space, where the result and final resolution (passed/failed with objections/failed) can be noted.• The test cases are to be described in English language (except the labels/buttons/software I/O texts and data I/O).• The first testing will be done by the contractor, but the test scenarios will be accessible, and the second times run by the PHPA or departments or UKZUZ as selected during the acceptance procedure. <p>The above mentioned does not intend to influence nor it may not replace any internal testing procedures of the contractor.</p>	
	TR002 User acceptance tests
Based on the test cases the system will be tested by UKZUZ and/or PHPA or the respective departments during the acceptance procedure for M2 and M3.	

4.5.3.3 Other (software) requirements - Migration requirements (MR)



What data/knowledge from previous instances of the product (application) shall be maintained and migrated into the new version (if any).

MR001	MR001 No migration
The project at this development stage does not foresee any data migration from no previous software versions or other data sources. This is without prejudice to (this shall not affect): <ul style="list-style-type: none">any requirements for altering design or project actions in such a manner to make this possibleor any requirements emerging in later stages of the project or later follow-up projects.	

4.5.4 Requirements catalogue - Other (project) requirements

4.5.4.1 Other (project) requirements - Project legal requirements (PL)

PL001	PL001 Contractor subject requirement
The contractor has to be an active legal subject (company) or self-employed physical person, established with accordance with its country's legislation, being able to fulfil the liabilities represented by this documentation and not undergoing any winding-up, liquidation or bankruptcy petition process.	
PL002	PL002 Contractors behaviour
Any project-related action or step (including any kind of business communication) of the contractor has to meet: <ul style="list-style-type: none">Czech lawBosna and Hercegovina law incl. local entity-based deviationsInternational laws and contractsPolite and respectful manners of business relations	

4.5.4.2 Other (project) requirements - Project management requirements (PM)

What managerial approaches and processes should be followed and what results achieved within the project of:

- development
- maintenance and operation
- testing
- implementation and setup
- handover
- etc.

Including DR&CP (Disaster recovery & Contingency planning) scenarios etc.

PM001	PM001 Project management responsibility
The contracting authority expects that the project is being managed and coordinated by the successful candidate, using any of the currently recognized formal project methodologies.	
PM002	PM002 Project documents repository
It is expected, that the candidate will also create and maintain in a central repository all the documents, that shall be output of the project, as prescribed by the list of documents (according to templates in POxxx requirements) and as prescribed by this document. Any documentation containing information of or about the following authorization classes must not be stored in repositories publicly or 3rd party accessible (this includes also data storage services such as Google Drive, Microsoft OneDrive, Drop Box etc.): <ul style="list-style-type: none">"secret" or "top secret"	



- "confidential"
- "protected"

where:

- secret or top secret = information of data or data being classified to the specified degree by national legislation, additional requirements for the subjects handling such data may apply, however this project does not foresee handling of any of such data
- confidential = information of or data, whose disclosure may directly reveal substantial information that might lead to any kind of abuse, gaining unjustified profit or predominance of one party above another one, this concerns also private (personal) data of physical persons including sensitive data about them. Data giving hint to-, forming or directly representing the meaning for whose control and record keeping the system is mainly designated are also considered confidential.
- protected = information being not publicly available, yet their knowledge gives or might give either direct or substantial indirect opportunity, facilitation or aid for gaining access to information with higher level of protection (e.g. confidential, secret or top-secret).
- non-public = information (or data) not belonging to either of the previous categories, however requiring protection and non-disclosure since they are not meant for publication (e.g. the scope of their intended addresses or other persons meant to deal with them is enumerable by a finite list of persons, contacts, groups, roles etc.). If not belonging into any of the previous categories, the "business know-how" and similar belong to this category.
- public = information or data belonging to neither of the previous categories, that can be or are being made available or accessible to anyone without preceding knowledge or designation of the scope of those subjects.

4.5.4.3 Other (project) requirements - Output and actions schedule milestones

In linked document:

During the execution of the contract, following milestone deadlines have to be met:

ID	Deadline	Deliverables present
M0	(date of contract signature)	Signed contract UKZUZ + contractor
M1	M0 + 4 months not later than 31 st of January 2020	<ol style="list-style-type: none"> 1. Acceptance protocol of system design and architecture signed by the representatives of UKZUZ and PHPA or departments (ENG/BOS/HRV/SRP) 2. Analysis and system design document – in the latest version, ENG. 3. Prototype / mock-ups (ENG)
M2	M1 + 8 months, not later than 30 th September 2020	<ol style="list-style-type: none"> 4. Acceptance protocol (ENG) 5. Analysis and system design documentation – including all annexes in their respective languages. <p>+ Filled test cases by UKZUZ and/or NFA/departments (not every test case is necessarily to be evaluated by all of them)</p> <ol style="list-style-type: none"> 6. Manuals (BOS/HRV/SRP/ENG lang. where appropriate) 7. Software <p>- installed in production environment as ready-to-manufacture version and the same in testing environment</p> <p>- commented and prepared source codes</p> <ol style="list-style-type: none"> 8. Project documentation pack version to the date M2 minus 2 weeks. 9. Training presence lists (signed by all attendees) – ENG/BOS/HRV/SRP language (may be postponed +3 months if necessary). <p>NOTE: This acceptance is being done on-site in Sarajevo (eventually: Brčko and Banja Luka) Bosna and Hercegovina with at least one</p>



		representative of the contractor (authorized to fully represent the contractor at least in the entire scope of the project – including contractual agreements) present during the formal handover procedures (does not necessarily apply on testing).
M3	M2 + 24 months	10. Handover protocol 11. Analysis and system design documentation – warranty claims resulting changes applied + changelog documents including all annexes in their respective languages. 12. Software + Source codes with changes applied 13. Manuals and other user documentation with updates (ENG/BOS/HRV/SRP)

Please note, that the abovementioned deadlines M1, and M2 reflect the **final date** of the acceptance procedure of the outputs, however some of the outputs (especially the installed software and “Analysis and system design document”) have to be present in their latest version for the respective milestone certain time earlier, as required by the testing and acceptance procedure defined within the Contract (that means at least 2 comments iterations, each in the duration of 10 working days/2 weeks at least, the mock-ups for at least one iteration of comment).

Based on the test results the delivery may be accepted, accepted with objection or not accepted at all. When a single test fails in such a manner, which makes the usage of the system or one of its use-cases or vital functionalities impossible, the system will not be accepted. However, in such a case (repeated acceptance) only that test, that have failed and have been corrected, shall be re-done. Those test results that are not influenced by the bug being corrected, may be reused from previous acceptance testing.

4.5.4.4 Other (project) requirements - Project outputs requirements (PO)

A note on the structure and list:

The meta-model diagram of documentation as well its descriptions are featuring the expected obligatory structure and minimum content of each of the items (minimum information given, e.g. elements and their relations used or minimum table-of-contents outline).

Note on the mandatory / optional items:

While an item in the following text or in the referred model may be labelled as "Optional" (or "OPT"), its inside textual description describing its outline may bear the tags "Mandatory". This is no way contradictory, it only means, that "SHOULD the documentation item be used (if necessary) THAN (and only then) it shall follow at least those outlines or mandatory elements/links required in its description."

The contractor may append any other diagrams/models/notation recognized as necessary during the project.

4.5.4.4.1 Project outputs requirements (PO) - General

PO000	PO000 Project outputs
The structure and requirements for project outputs refer to the appropriate diagram "Delivery content (incl. metamodel) - Documentation structure"	



PO001	PO001 Output forms - methodical
<p>Any diagrams or schemes being part of the project output in neither technological representation should be created:</p> <ul style="list-style-type: none"> Using a formal notation such as the preferred UML (1.1 and above) or BPMN, EPC or ArchiMate (version 3.x preferred). <p>OR</p> <ul style="list-style-type: none"> (especially for smaller/high-level schemas or schemas intended for end users) Using any notation, supposing all the elements used within the schema are covered in the appropriate legend. 	
PO002	PO002 Output form - technological
<p>The system documentation described as "MODEL" shall be delivered</p> <ul style="list-style-type: none"> as a shared model (no important what technique, if a mailed/shared eapx/feap file, XMI imports/exports including those realized using the CVS integration or shared SEA cloud or database) as a model report (DOC(X) or PDF with reasonable size, split into multiple documents and reasonable comments period) <p>with an exception of those marked in dark orange colour in the diagram (Data-logical diagram, Interfaces layout schemes/designs and Components breakdown and their functions), that are to be delivered as readable by non-it personnel (a specific SEA report template fulfilling this requirement is also acceptable).</p> <p>The system documentation described as "USER DOCUMENTATION", while it may be stored in the model as empty packages containing linked documents only, shall be delivered as:</p> <ul style="list-style-type: none"> Human written and non-IT specialist readable Office format documents (PDF, DOCX, XLSX, PPTS, JPEG/PNG/BMPs or open software variants thereof). <p>The documentation described as "PROJECT DOCUMENTATION", being stored separately, shall be delivered in those formats the contractor sees fit, if not able to export / preview in software without a licence or free of charge, the contractor has to provide at least 4 licenses to the contracting authority for the entire duration of the project including its warranty period.</p>	
PO003	PO003 Trackback
<p>For all SEA model elements applies:</p> <p>All these have to be traced back either to any meeting or other kind of dialogue within the analysis phase or to the original requirements within this Tender annex. Should any chapter/requirement of this annex prove as obsolete, this has to be mentioned explicitly in the "Analysis and system design document".</p>	
PO004	PO004 Language
<p>All project outputs shall be in English language, with exception:</p> <ul style="list-style-type: none"> Software I/O on GUI as per UR004 User and administration manuals, same multilingual rules apply as UR004 	

4.5.4.4.2 Project outputs requirements (PO) - Analysis and system design documentation

This document has to address following aims:

- The "central point" for capturing of requirements, architectural concepts and decisions
- The reference (may be auto-generated) for (public as well private/protected etc.) modules, classes/source files, methods, variables and data entities (persistently stored as well used inside the run-times)

It is required, that the "Analysis and system design document" exists in the following versions, e.g. is created and updated (maintained) at least for following stages of the project:

- Initial writing – the version is to be embodied by the accepted document after the analysis&design phase (= delivered by M1)
- Finalization for the project acceptance (delivered by M2) – this version should incorporate seamlessly all the changes done during the project implementation & testing and has to reflect exactly the state of the software/system as accepted during the acceptance phase.



- Finalized version + differential change lists (annexes) AND entirely updated document if any warranty corrections should be done (delivered by M3) – Documents recording the changes that have resulted from any warranty claims. Change lists should refer to relevant warranty claims or have their own acceptance clause, the updated document(s) (incl. source code) are to be delivered only as electronic version with all the factual changes resulting from changelogs have to be reflected.

The minimum content is as follows:

PO005	PO005 (updated until M1, M2, M3) Business input and requirements
Consisting of (horizontal spec.): <ul style="list-style-type: none">Requirements catalogue, issues and the changed/added requirements (SEA "Custom diagram"),and thereof resulting users/roles (UML or ArchiMate)carrying out their respective use-cases and/or process(es) on the data, (UML/ArchiMate, BPMN where necessary)enlisted as a full list of data entities existing throughout the entire system and their relations, including full list of their attributes (logical perspective, not physical) (UML class diagram). Optionally: data entities may be additionally represented multiple times with specification of variants of each used for persistence, data flow within the I/O of various interfaces etc. (for example: while a person may have the set of 20 attributes, this data entity may be represented not only as "general one" having 20 attributes, but also as a data entity of some say WS or GUI, where only 10 of the attributes are used).	
Minimum level-of-detail (LOD - vertical spec.): <ul style="list-style-type: none">All requirements/issues/changes independently on their respective LODuser/roles independently on independently on their LOD, entire list of roles (and their permitted functionalities) must be presentdata entities on logical level up to their atomic attributes, where the word "atomic" means "representable as some electronically recognized data type"	
PO006	PO006 (updated until M1, M2, M3) System architecture design
Consisting of (horizontal spec.): <ul style="list-style-type: none">Architecture (breakdown) of modules/components of the system and their respective functionality (ArchiMate - app layer (preferred) OR UML Component)Interfaces design/layout of GUI, WSs, APIS containing: For webservices: methods list, their I/Os attributes and exceptions. For GUI: rich textual description of the functionalities, schemas up to the detail of data attributes (depicted as input fields labels and list/table headers) and functionalities, featuring at least one example representing also the graphical layout (template) for each type of functionality.Detailed data documentation for each of the module (data structure in the database, data structure of I/O messages etc. - note: the diagram may contain only the DB persistence, the other may be and are encouraged to be part of the respective documentation of WSes, system classes (such as MVC - Model) etc.) (ERD / UML Data modelling diagrams)Deployment diagram (how the respective modules/components are deployed and where (ArchiMate technol. layer (preferred) OR UML deployment diagram)Test cases (UML testing) Note: As one may reason from the text above, the architecture design documentation is required only in the form of a "static" perspective. However, a dynamic (process-oriented) documentation has to be added where the collaboration of multiple parts of the system may not be easily deduced. However, this dynamic view documentation does not have to be comprehensive (done for each of) for all the functions/functionalities/cases/processes intended within the system.	
Minimum level-of-detail (LOD - vertical spec.): <ul style="list-style-type: none">Architecture of modules/components of the system = a "module" is considered up to a component having the size of single I/O screen/report or its part devoted to a single or prevailing data entity, proposed minimum LODs:<ol style="list-style-type: none">General overview of modules (= system and its main parts forming different binaries to be setup on different servers)(or up to 3.) Modules structure (what pages/templates/ function groups/WSs/robots or automated agents triggered events etc. the part consists of)	



OPT: 3. (or up to 4.) Inside parts structure (control sets/custom control/ custom sub-templates/WS methods) does each page/function group/WS consist of.

- their respective functionality = full list of functions that the part (on level 1.-2. above, optionally: 3.-4.) provides, the LOD of the functions is let up to the discretion of the contractor
- Data (physical representation) up to their atomic attributes, where the word "atomic" means "representable as some electronically recognized data type"
- Deployment diagram = components representable as artefacts, e.g. packages deployable on nodes, nodes and infrastructure describing a technologically configurable environment
- Test cases (UML testing) = at least in such a detail, that each test-case belongs to each function/requirement or small groups thereof.

4.5.4.4.3 Project outputs requirements (PO) - Manuals

As annexes to the Analysis and system design document, following system manuals are to be delivered as addition to the abovementioned documentation (each in all languages as indicated by the abbrev. in braces):

PO007	PO007 (until M2, updated if necessary until M3) The user manual (ENG/BOS/HRV/SRP)
Fully describing all of the functionalities and processes covered by the software and the ways of their usage designated for all roles of end-users, excl. user-side administrators.	
PO008	PO008 (until M2, updated if necessary until M3) The user manual for administrator
Fully describing all of the functionalities and processes covered by the software and the ways of their usage designated for the user-side administration tasks (such as for example the editing of registry or selection lists if not covered by a (manual for a) specific GUI).	
PO009 (updated until M2, M3) Technological administrator and deployment manual	<ul style="list-style-type: none"> • Deployment and technological architecture manual, including <ol style="list-style-type: none"> 1. full step-by-step manual for installation of the application (including basic schemas of application layout and setup possibilities, if applicable), 2. the documentation of all the configurable variables in any configuration repositories (such as but not limited to: the Microsoft Windows registry, any text/xml/csv/tabbed/json and similar files, the database, configuration repositories of any kind in any proprietary software including the RDBMS being used, templates/reports and the available variables for the report templates configuration; if a 3rd party software is used, then the documentation may be covered by the documentation of the 3rd party software itself, however an addendum has to be made about how the configuration influences the delivered software) and 3. Network architecture and ports used between the components (may use the "Deployment architecture" diagram). 4. Backup & recovery plan containing: <ul style="list-style-type: none"> • Analysis of data assets (may be part of data models) • Architecture of backup solution(s) being employed • Data assets <--> backup solution(s) (which asset is backed up by what solution and with what frequency, type of backup etc.) • Steps to check the backups being done correctly (per typ of backup solution) or (should this require manual operation) the manual for performing these steps. • Steps to recover each data asset (per type of backup solution)
PO010	PO010 Developer documentation (workstation setup + licenses)
<ul style="list-style-type: none"> • Development prerequisites needed for the code to be run (including 3rd party tools installers where possible or necessary from the point of view of the licensing terms) incl. processes and means of keeping track of changes and patching changes made during the warranty period. + Development environment setup guide (may include virtual machines images, services mock-ups etc., however these do not substitute the step-by-step guide) 	



- License numbers / registration data for components that should require such a number or registration.
- Source codes files / configuration projects and resources structure overview and description (UML: any kind of structured overview of the files groups and their link to respective modules (architecture modules - LOD 1.)) + their inner logical program design structure (classes, object model)

PO011	PO011 API Developer documentation
Public and internal API (each as separate document!) developer documentation, one for each type of an endpoint (SOAP/DLL/COM, header files, network endpoints etc.) describing: <ol style="list-style-type: none"> 1. Methods exposed (including their link to relevant requirements and the processes it belongs to) 2. Their I/O data and their attributes up to atomic items (primitive datatypes), including their allowable ranges and content types/forms; in case of numbers or lists influencing the flow of the handling of the data also with documentation on the specific values and the consequences on the process for each of them. 3. Their exceptions and errors that can be thrown/returned, their possible reasons (as a short textual fault analysis guide) and possible solutions. 	

4.5.4.4.4 Project outputs requirements (PO) - Project documentation

PO012	PO012 (continuous updates) Project documentation
The project (management) documentation shall consist of: <ul style="list-style-type: none"> • Contractual docs (e.g. the contract, its attachments, amendments and contractor proposal in the tender) NOTE: While the electronic copy of these document shall be accessible within the repository, the contractor does not have to provide it back to the awarding authority when delivering the delivery at any milestone. • Cooperation requirements plan (required role + schedule) - may be done also as a set of (outlook or other similar PIM) invitations with at least one month in advance • Repository of meeting minutes. • Project plan as per PO013 including schedule 	

PO013	PO013 (continuous updates) Project plan
A project plan has to be created and further maintained by the candidate (contractor), containing at least the following information: <p>A) An organizational a managerial structure of the project, consisting of:</p> <ul style="list-style-type: none"> • Roles of project participants • and their mutual relations • and their competencies within the project and outside the project (towards the broader scope of stakeholders around the project). • The name of physical persons acting within these roles (employees or equivalent of the contracting authority as well the contractor). <p>B) The project schedule (based on the required schedule as described in these terms and requirements), including the milestones of the project, that have been identified and set during the preliminary as well main analytic phases. It is required, that at least following phases and their items are scheduled within the schedule (the following list does not cover those phases/items, which arise or might arise from other requirements):</p> <ol style="list-style-type: none"> 1. (phase) Analysis: (item) physical presence for analysis phase on-site 2. (phase) Analysis: (item) creation of the "Analysis and system design documentation" 3. (phase) Analysis: (item) creation and opponency of schemas/mock-ups or beta-version of the GUI of the final system 4. (phase) Analysis: (item) opponency & acceptance process of the "Analysis and system design document" 5. (phase) Analysis: (milestone) Acceptance of the "Analysis and system design document" 6. (phase) Testing: (item) physical presence for supporting the (acceptance) testing phase on-site 7. (phase) Testing: (item) Acceptance testing by the contracting authority 8. (any appropriate phase) training periods 9. (phase) Support: (item) Support (remote or on-site in Bosna and Hercegovina (any entity/city), when needed) for warranty claims that might emerge during the production usage of the system within the warranty period agreed within the contract. <p>C) List and contents (and preferably templates) of relevant project documents</p>	



D) Project meeting types and schedules

E) Other project-dependent processes and their agendas including the required cooperation by the contracting authority

4.5.4.4.5 Project outputs requirements (PO) - Software

As annexes to the Analysis and system design document, following software are to be delivered:

PO014	PO014 (continually) Software - installed instance
As a part of the delivery, the software has to be installed (and covered by all licenses required): <ul style="list-style-type: none">(until M1) Mock-ups /beta-version prototype in any remote-access capable environment provided by the contractor, based on the “Analysis and system design document” initial writing version(until M2) Set up in designated testing/production environment as beta version / launch version.(until M3) Code changes applied and delivered according to the warranty period changes. + testing protocols for those (regression) tests that are relevant to these changes.	
PO015	PO015 (continually, optionally) Software - updates and patches
It may be, that by recommendation, no 3 rd party employees will have access to the production environment. In such case following documents and sources have to be provided for each patching/update of the production software (typically bugs correction during the warranty period), this also applies for client-side software if necessary: <ul style="list-style-type: none">Patch binaries/install packages in a form best ready for the installation with the smallest number of steps required (for example: source code is all right, if the installation means the copying of scripts into the web-app directory or compilation with heavy optimization for the target platform that cannot be done in the development environment or is required due to security reasons or considerations; however pre-compiled binaries for Copy&Paste or registration or one-click install – such as but not limited to installation scripts/projects - are preferred)Patch manual – step by step guide for installing the patch, including the editing of configuration files etc.Patch tools – any tools necessary for the execution of the steps described in the manualClient-side software only: Installation tool suitable for user-side install done by operator with little or no IT-related knowledge or suitable for remote/bulk deployment on the target platform. The delivery mentioned above may be omitted if agreed otherwise with the UKZUZ/PHPA/departments during the analysis.	
PO016	PO016 (updated until M2, M3) Software - source codes
<ul style="list-style-type: none">As a part of the delivery, the entire source codes created or being used within the development of the software in any way, unless licensed separately as 3rd party closed binaries, have to be handed over during handover/acceptance (M2, M3). All source codes have to meet following requirements: <ul style="list-style-type: none">Commented in such a level of detail, that at least blocks of code performing complex functions are being described. The comments have to be exclusively in English language.They all meet the same form of indenting, brackets usage etc.All variables (including any persistent data such as DB structure description elements and including runtime data such as method parameters or API attributes) have to be named in English language (when the variable name is representing any meaningful information, this does not apply for indexing variables, technological filed/stack/pointer counters etc.) This does not apply for those packages/scripts/objects and other entities of the systems, where such commenting is not possible or some of the concepts (such as variables, bracketing/indenting etc.) are not being used. <ul style="list-style-type: none">Any changes made during the warranty period have to be handed over as well (as changelog, differential patches or similar), including one last handover of the entire (patched) code at the end of the warranty period or the whole set of patches once more.During the warranty period of at least 2 years the contracting authority (or any 3rd party in contracted by them) is/are not entitled to make any changes of the software without providing the relevant differential patch being shared and accepted by the contractor by means as described and approved in the “Analysis and system design document” by the contractor.	



- The contractor is then required to patch his version of source codes (or similar packages/projects/configurations) in order to be able to provide warranty changes.
- The contractor is not to be held liable for any bugs resulting from within these patches. For clarity the word “resulting” means in the context of this paragraph that either the patched lines/segments of code/configuration entities either throw an unexpected/unhandled error or they alter the data of the application in such a way, that any other lines/segments/configuration entities, even the original ones, throw an unexpected/unhandled error due to this concrete data value. “Data” means not only persistent ones (files, database etc.), but also the runtime data (variables, temporary files, calling parameters of functions/methods, network transported data etc.) within any part of the software application system.

4.5.4.5 Other (project) requirements - Minimum project actions (tasks) requirements (PA)

PA001	PA001 Project actions general
The contractor shall ensure and perform all steps necessary to reach the goal and aim of the project - the delivery of the system as required by the requirements specified in this document. Above this, following mandatory steps cannot be omitted:	
PA002	PA002 Analysis on-site
It is required, that the contractor provides at least one physical presence on-site (Sarajevo/Banja Luka/Brčko in Bosna and Hercegovina) for performing the process of analysis within the proposed scope.	
PA003	PA003 Analysis in Czech Republic
It is required, that the contractor performs at least one physical presence in Czech Republic (Prague) for performing the process of analysis within the proposed scope.	
PA004	PA004 Acceptance testing on-site
It is required, that the contractor provides at least one physical presence on-site (Sarajevo/Banja Luka/Brčko in Bosna and Hercegovina) in order to support process of testing within the proposed scope.	
PA005	PA005 User training on-site
<p>It is required, that the contractor performs an on-site training in English language for following target audience:</p> <ul style="list-style-type: none"> • 5 system administrators if at least 1 nominated by the BiH side (IT administrators/developers as well data/user administrators of total max. 5 persons) • 20 users if at least 1 nominated by the BiH side <p>in the total length of at least 2 days (1 day if no users or no administrators are nominated, 0 days if no users nor administrators are nominated), covering at least following themes:</p> <p><u>IT administrators/developers:</u></p> <ul style="list-style-type: none"> • Source code structure and blueprints/patterns used and employed • System architecture and design (incl. DB entities and relations and key sets of namespaces/packages/classes) • Internal API of the application (incl. DB objects such as stored procedures, triggers etc.) • Application installation and setup parameters (configuration, registry, command line parameters) • Trainees questions <p>(All the above-mentioned themes especially in such a manner, so that is explaining combination and influence between the various parts of the system.)</p> <p><u>Administrators – data/app:</u></p> <ul style="list-style-type: none"> • Explanation of the admin GUI • Administrative tasks and the performing their of incl. the demonstration of the impacts in the user-side • Trainees questions 	



Users:

- The application GUI and generic tasks/procedures - handling all the processes as per functional requirements.
- The use-cases and the performing thereof; incl. the methodology and methodical remarks
- Advanced tasks accessible to the users but not necessary for everyday usage
- Demonstration of admin GUI and the impact on the user-side of the application

4.5.4.6 Other (project) requirements - Cooperation requirements (PC)

The candidate shall indicate in his proposal, what kind and range of cooperation he expects from the contracting authority. This should be done for the following parts of the project:

PC002	PC002 System design, implementation, testing, acceptance
Cooperation needed for system design, implementation, testing and acceptance	
PC003	PC003 Production deploy & operation
Cooperation needed for system production run within the warranty period	
PC004	PC004 Risks
Cooperation needed for acceptance, mitigation, transfer or prevention of risks (in such case a risk analysis has to be performed, listing all threads possible, the likelihood of their occurrence, impact analysis and the proposed type of reaction).	
PC005	PC005 Other cooperation
Other cooperation needed incl. training	
PC001	PC001 Project management
Cooperation needed for project management	

4.5.5 Requirements catalogue - Tender proposal requirements

The technical part of the contractor (tender contestant) proposal should contain:

	Tender001 Preliminary architecture
Preliminary architecture (as per PO006 - modules breakdown) (may be based on the diagrams being part of this document) specifying concrete platforms, techniques, concepts and 3rd party tools the contractor is expecting to use in order to deliver the various parts/modules of the solution.	
	Tender002 Preliminary data architecture
Preliminary data architecture (as per PO005 or PO006 - data documentation/entities) (may be done as non-contractually obligatory database data model) refining as observed and analysed from the data diagram and functional requirements.	
	Tender003 Interface schemes
3-5 schemas of selected interfaces (as per PO006 - Interfaces design) with statement what parts/characteristics are typical for the platform used and which may be customized as part of the project, featuring at least one (general) graphical layout example of either previously done applications or designed specifically for the contract presenting the proposed graphical design.	
	Tender004 Backup solution
Proposed backup solution and its architecture and processes.	
	Tender005 Project management and testing
Project procedures and testing (internal) the contractor is intending to employ within the project.	



Tender technical requirements and conditions

The register of fertilizers in BiH



Tender006 Patching cooperation

Project procedures the contractor is intending for the patching and cooperation with the developers during the warranty period (when both sides - the users, developers and the contractor - may alter the code).

Tender007 Project plan

Preliminary project plan (as per PO013) featuring yellow "TODO" in those places the contractor cannot be yet sure of and additionally including:

1. gaps and questions currently open from the point of view of the contractor,
2. cooperation requirements as per PCxxx (including preliminary risk analysis if applicable).

Tender008 Preliminary HW requirements

As per OR003 the required HW for deploying the solution has to be specified.

(optional) Tender009 DWH realization

In case the RDBMs is not a not standard one, it is required that the description of realization of a data warehouse (DWH) for OLAP on such a solution (how facts and dimensions are recorded and read).

(optional) Tender010 License pricing and maintenance/assurance

If any additional licenses are to be acquired for the solution, the tender proposal has to enumerate:

- the price for such a licence
- any kind for a maintenance / assurance for 2 years