SEVENTH FRAMEWORK PROGRAMME

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THEME 2
Food, Agriculture and Fisheries, and Biotechnologies

Grant agreement for: **Support Action**

Annex I - "Description of Work"

Project acronym: agriXchange
Project full title: A common data exchange system for agricultural systems
Grant agreement no.: 244957

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List of Beneficiaries

no.	Beneficiary name	short name	country	Date enter project	Date exit project
1.	Agricultural Economics Research Institute	LEI-WUR	Netherlands	Month 1	Month 36
2.	Animal Sciences Group	ASG-WUR	Netherlands	Month 1	Month 36
3.	Kuratorium für Technik und Bauwesen in der Landwirtschaft	KTBL	Germany	Month 1	Month 36
4.	MTT Agrifood Research Finland	MTT	Finland	Month 1	Month 36
5.	Wireless Info	WRLS	Czech Republic	Month 1	Month 36
6.	Institut de l'Elevage	ELEV	France	Month 1	Month 36
7.	Institut de Recerca i Tecnologia Agroalimentàries	IRTA	Spain	Month 1	Month 36
8.	Teagasc	TEAG	Ireland	Month 1	Month 36
9.	Universität Rostock	ROST	Germany	Month 1	Month 36
10.	Forschungsinstitut für Biologischen Landbau	FIBL	Switzerland	Month 1	Month 36
11.	Altavia	ALTA	Italy	Month 1	Month 36
12.	Poznan University of Life Sciences	PULS	Poland	Month 1	Month 36
13.	ACTA Informatique	ACTA Info	France	Month 1	Month 36
14.	Progis software	PROG	Austria	Month 1	Month 36

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PART A

A.1 Budget breakdown and project summary

A.1.1 Overall budget breakdown for the project

Participant number in this project [9]	Participant short name	Estimated eligible costs (whole duration of the project)				Total receipts	Requested EC contribution
		Coordination / Support (A)	Management (B)	Other (C)	Total A+B+C		
1	LEI WUR	156,300.00	115,000.00	0.00	271,300.00	0.00	200,839.00
2	ASG WUR	102,177.00	0.00	0.00	102,177.00	0.00	66,928.00
3	KTBL	133,754.40	0.00	0.00	133,754.40	0.00	119,264.00
4	MTT	146,280.00	0.00	0.00	146,280.00	0.00	93,090.00
5	WRLS	128,800.00	0.00	0.00	128,800.00	0.00	115,930.00
6	ELEV	90,000.00	0.00	0.00	90,000.00	0.00	80,250.00
7	IRTA	32,163.00	0.00	0.00	32,163.00	0.00	28,697.00
8	TEAGASC	42,850.00	0.00	0.00	42,850.00	0.00	35,136.00
9	ROST	28,800.00	0.00	0.00	28,800.00	0.00	25,680.00
10	FIBL	34,920.00	0.00	0.00	34,920.00	0.00	31,137.00
11	ALTA	36,180.00	0.00	0.00	36,180.00	0.00	32,260.00
12	PULS	31,300.00	0.00	0.00	31,300.00	0.00	28,180.00
13	ACTA Info	128,280.00	0.00	0.00	128,280.00	0.00	114,383.00
14	PROG	30,960.00	0.00	0.00	30,960.00	0.00	27,606.00
TOTAL		1,122,764.40	115,000.00	0.00	1,237,764.40	0.00	999,380.00

A.1.2 Project summary

Within the knowledge-based bio-economy, information sharing is an important issue. In agri-food business, this is a complex issue because many aspects and dimensions play a role. An installed base of information systems lack standardization, which hampers efficient exchange of information. This leads to inefficient business processes and hampers adoption of new knowledge and technology. Especially, the exchange of information at whole chain or network level is poorly organized. Although arable and livestock farming have their own specific needs, there are many similarities in the need for an integrated approach. Spatial data increasingly plays an important role in agriculture.
The overall objective of this project is to coordinate and support the setting up of sustainable network for developing a system for common data exchange in agriculture. This will be achieved by:

- establishing a platform on data exchange in agriculture in the EU;
- developing a reference framework for interoperability of data exchange;
- identifying the main challenges for harmonizing data exchange.

First, an in-depth analysis and investigation of the state-of-the art in EU member states will be carried out. A platform is built up that facilitates communication and collaborative working groups, that work on several, representative use cases, guided by an integrative reference framework. The framework consists of a sound architecture and infrastructure based on a business process modeling approach integrating existing standards and services. The development is done in close interaction with relevant stakeholders through the platform and international workshops. The results converge into a strategic research agenda that contains a roadmap for future developments.

The project consortium consists of 14 partners from 11 countries covering different disciplines, stakeholder views and experiences with information management and standardization.

Keywords: standardization; harmonization; information sharing; service-oriented approach; business modeling; living lab

A.1.3 List of beneficiaries

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PART B

B.1 Concept and objectives, quality and effectiveness of the support mechanisms and associated work plan

B.1.1 Concept and project objectives

In this section, we explain the concept and main ideas that have led to the proposal of this project, addressing the topics of the call. First, we describe some background developments that lead to formulation of the problem statement. Next, the main objectives of the project are described, followed by a brief description of the direction for solutions. Finally, the state of the art in some 'guiding countries' is described.

B.1.1.1 Background

In this section, we describe in general the current developments in agri-food that make the issue of information sharing a crucial factor. Smooth exchange of information is needed, but as explained the subsequent sections, in agriculture, this is not an easy task, neither in arable nor in livestock farming.

Current developments in agri-food

Current agri-food economy focuses on consumers and their food supply. The consumer should be enabled to make choices, based on aspects such as food safety, quality and sustainability (e.g. fair trade, CO_2 emissions, etc.). Correct and complete information is crucial in this process. Moreover, Kinsey (2001) states that information becomes a competitive factor. This means that the business environment of agri-food production is very dynamic, driven by various and changing needs of consumers and society. Production is becoming more demand-driven, has to be transparent and must meet quality and environmental standards. Several incidents in the last decades (e.g. foot and mouth disease, swine fever, dioxin scandals) have made food safety one of the major issues. Meeting these requirements gives actors in the supply chain a 'license to produce'. Besides, agricultural markets in Europe are under pressure because of high land and labor prices in combination with intensified competition due to globalization. One main answer to this development is to innovate towards a more demand-driven and knowledge-based production, which is in accordance with the overall objective of the EU knowledge-based bio-economy (KBBE).

A further analysis of this development was done by the Global Commerce Initiative in describing the future value chain for 2016 (GCI, 2006). They identify several external driving forces, outside the direct control of industry, retail and consumer product companies, that can be grouped into five areas:

- **Economic issues**, including the reshuffling of the world's top economies, the growing gap between industrialized and developing countries, as well as a focus on social responsibility among the more developed countries in areas such as fair trading.
- **Ecological issues**, including water, energy and fuel scarcity and efficiency, sustainability and waste management.
- **Changing demographics**, such as the shift in global population, urbanization and cross-border migration.

- **New technologies**, such as virtual reality, quantum computers and information networks, have the potential to make data, people and objects accessible everywhere and immediately.
- **Regulatory forces**, including extended legislation on health and wellness (for example, labeling of products) and privacy standards.

At the same time, there will be key industry trends that will affect the future value chain, particularly in the areas of consumer behavior, information flow and product flow. In contrast to the external driving forces, it is possible to shape these internal forces. GCI sees a convergence of these external forces and industry trends that will drive the evolution of the value chain. From that point of view, they identify six critical areas of opportunity and growth and improved performance of which **information sharing** is the most interesting in the context of this project. About information sharing they state the following:

> *Companies must be prepared to share standards-based data free of charge. Sharing information (such as supply chain events) between trading partners will result in an improved information flow and, as a consequence, improved collaboration to better serve the consumer. A resulting collaborative information platform could become the basis for further supply chain solutions, like demand-driven ordering and collaborative promotion planning.*

Thus, GCI envisions an **open network**, with flexible relationships between network partners, which implies less hierarchical, linear chain structures. This has consequences for innovation that will be developed within these open networks, together with changing, sometimes anonymous, partners. There will be less focus on the products themselves and everything is considered as a **service**.

ICT could enable information sharing and thus facilitate and improve a knowledge-based production because ICT could help to:

- organize and streamline large amounts of data in an effective way (data warehousing)
- make knowledge accessible (e-content) and put it in the right context for application (e.g. by context-sensitive search)
- combine knowledge and data in models that are meaningful in the right context (e.g. in decision support systems)

Related to this potential of ICT, fourteen organizations from different countries initiated the EU-supported AMI@Netfood project (AMI@netfood) in the sixth framework program. The project results showed that there is a clear need for a sectoral-oriented approach on ICT in agri-food and rural domains. Currently, such sectoral approaches are not effectively implemented in all EU regions, or as EU-RTD strategies. To achieve a more effective implementation of EU-wide RTD activities, it will be necessary to harmonise the different RTD strategies in different regions. Currently, cross-regional collaboration is limited, and inadequately implemented. The AMI@Netfood working groups have highlighted the importance of supporting the new vision of Collaborative Working Environments in the agri-food and rural domains. They envisage a new collaborative environment oriented to directly supporting the activities of individuals and groups, allowing effective collaboration across diverse actors in the agri-food industry, consumers and the wider community, especially in rural areas. The key issues identified which should be addressed in the application of ICT in agri-food and rural domains are:

- traceability of products & services

- collaborative working environments
- innovation & development in rural areas
- ICT applications & infrastructure

In comparison with the GCI vision, there are similar aspects such as the emphasis on collaboration in an open network and use of services, but AMI@Netfood complements this vision by including the rural areas and emphasizing the role of developing the ICT infrastructure. During the EFITA conference in 2005 in Portugal it was confirmed that especially with respect to these aspects the government plays an important role.
Moreover, Fig. 1 tries to indicate that information sharing is a common objective of the agri-food business as well as the government with respect to communication and control in general. There is a common need for the same information, although from different perspectives. The government looks at information from the perspective of law and regulation and public objectives in general. The agri-food business looks at information from business perspective and with respect to their 'license to produce'. Sharing information between farmers and administrations is essential within the context of the CAP that increasingly focuses on cross-compliance and agro-environmental traceability. This emphasizes that the government also plays a major role in information sharing in agri-food production. Because the administration is regarded as an independent public body, it sometimes can have a crucial directing role in how to share information and in some cases it plays an obligatory role by legislation.

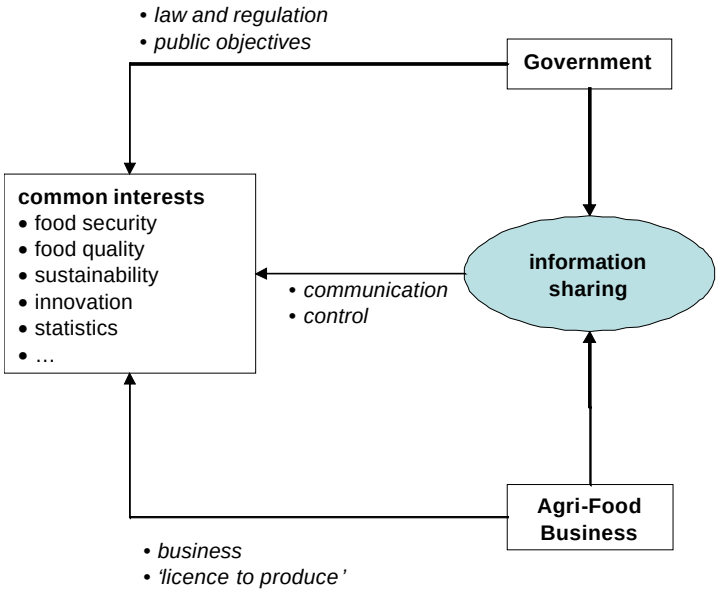

Fig. 1 The common need for information sharing of agri-food business and government from different perspectives

A key piece of legislation affecting the use of public sector information is the European Directive on the Re-use of Public Sector Information (PSI)[1]. It obliges governments to create national policy on public data re-use. The European Commission (EC) describes the directive's objectives as:

[1] http://ec.europa.eu/information_society/policy/psi/actions_eu/policy_actions/index_en.htm

> "It sets minimum rules for the re-use of PSI throughout the European Union. In its recitals it encourages[2] Member States to go beyond these minimum rules and to adopt open data policies, allowing a broad use of documents held by public sector bodies."

The UK Government set up an Advisory Panel on Public Sector Information (APPSI)[3] as part of its process of implementing this Directive. There is also a new data unlocking service, where one can make a request for certain data. Together with the EU, there is activity in the US. An Open Government Working Group has a wiki with some good links to US initiatives[4]. This group has published a set of principles for open government data and invites to participate in the discussion.
In conclusion, for the governmental, public bodies, there is a similar trend towards an open network in which information and data can be shared. The aspect of data re-use fits in the general trend of shifting to focus on services. So instead of just publishing the data, one should start from a more functional use point-of-view. In the search for these functions, more interaction between government and private business will be beneficial.

Conclusion 1
Within the knowledge-based bio-economy, information sharing is an important issue. ICT can play an enabling role to facilitate the focus on services. Agri-food business and government tend to cooperate with each other in open networks.

Complexity of information sharing in agri-food
ICT is widely utilized in the European agri-food sector, by all actors involved such as administrations, farm management, production process control and trading. The implementation level of ICT and use of standards vary by sector and country. Parts of the systems are designed to satisfy local needs of information management. Typical examples of such systems are national registers and farm management systems. Other parts of the available systems are designed for international use, such as information management systems for production process control and trading. Most of these systems have their own justified basis for information (transfer) structures. This can easily lead to miscommunication in applications at the whole chain level.
From various research, it can be concluded that the level of standardization for data, application and process integration is still quite poor, leading to the following interrelated, negative effects (Verdouw et al., 2007):

- the choice of components (hardware or software) for farmers is often limited because data exchange is difficult or impossible;
- increase in costs because of double investments in system components with different interfaces;
- the effort for collecting, converting and exchanging necessary data is large, while the possibility for making errors is high;

[2] In the summer of 2008 the European Commission has put out a call to establish a European Public Sector Information (PSI) central platform to further stimulate action and monitor progress towards a stronger and more transparent environment for the growth of national and European markets in PSI re-use. The service will be built around an interactive web-based portal ("one-stop-shop"), providing news on European PSI developments, emerging good practices, examples of new products and services and legal cases around PSI re-use. The work will build on earlier activities supported through eContentPlus programme (notably the ePSIplus thematic network) and within Member States.
[3] http://www.appsi.gov.uk/
[4] http://wiki.opengovdata.org/index.php/Main_Page

- it is difficult to integrate (farm-specific) data and knowledge that is locked up in scientific simulation models
- decision-support is sub-optimal and as a consequence also decision-making;
- transparency and accountability requirements often lead to administrative burdens.

This hampers the potential efficiency gained by using information technology and adoption of newly available technologies. Nevertheless, automation, both in controlling execution processes (machinery) and in information management of operational, tactical and strategic processes is a key to improve efficiency. New ICT and GIS technologies provide possibilities to enhance the efficiency of processes in production, administration and trade.
In Fig. 2, three dimensions are identified along which information exchange can be described:

- agri-food processing chain, from basic suppliers to consumers.
- government chain, from basic production items and production units at enterprise level, via local authorities up to the EU level
- enterprise chain, from basic production items, production units, people, equipment, environment up to the market level.

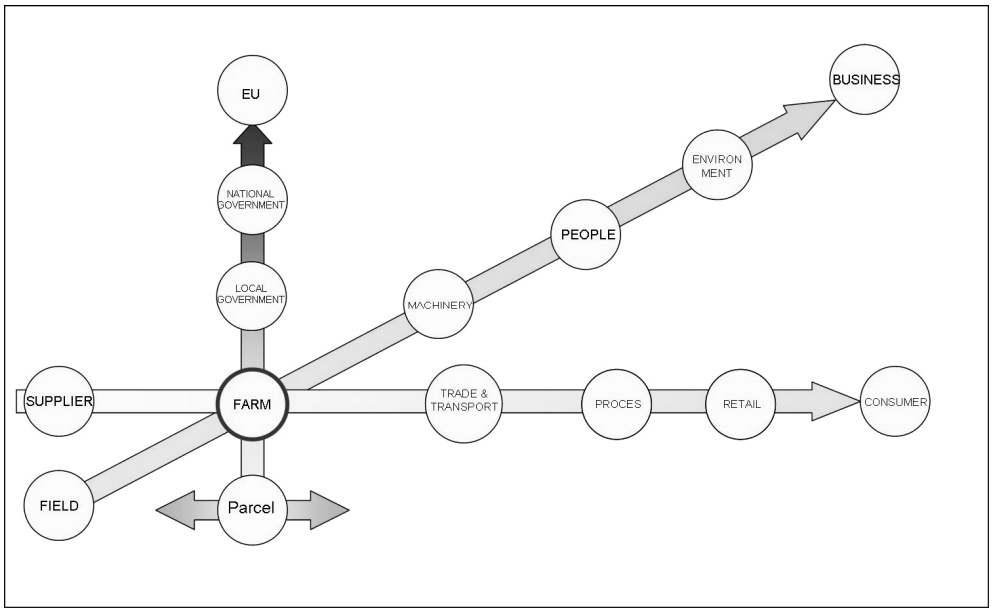

Fig. 2 A three dimensional schema of agro food branch which form a functional focus frame for the data exchange in agriculture (source: Daniel Martini in a presentation at OGC Forum, Ispra, Italy, 2008).

The three dimensions are drawn from a farmer's perspective, with the farm at the cross section of the axes. All axes can be shifted having the cross section at different places, dependent on the chosen point of perception. There are many relationships between the nodes on the three dimensions. Each relation between two nodes has its own right to exist, having specific partners, a specific information exchange process with a corresponding information exchange. All types of actors, their business processes, data collections and used information exchange definitions and e-standards can be located into the 'agri-food branch framework' (see Fig. 3).

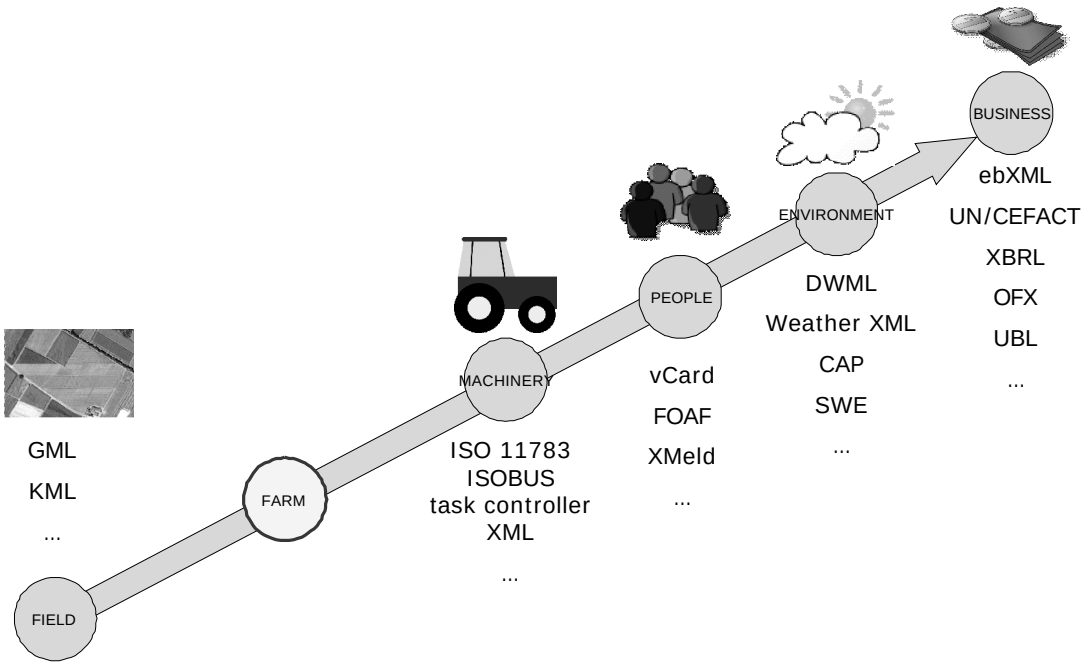

Fig. 3 The diagonal axis of the agri-food branch framework with several examples of existing standards (source: Daniel Martini in a presentation at OGC Forum, Ispra, Italy, 2008)

When all these parties and information flows are drawn down the resulting picture looks like the 'spaghetti schema' of Fig. 4.

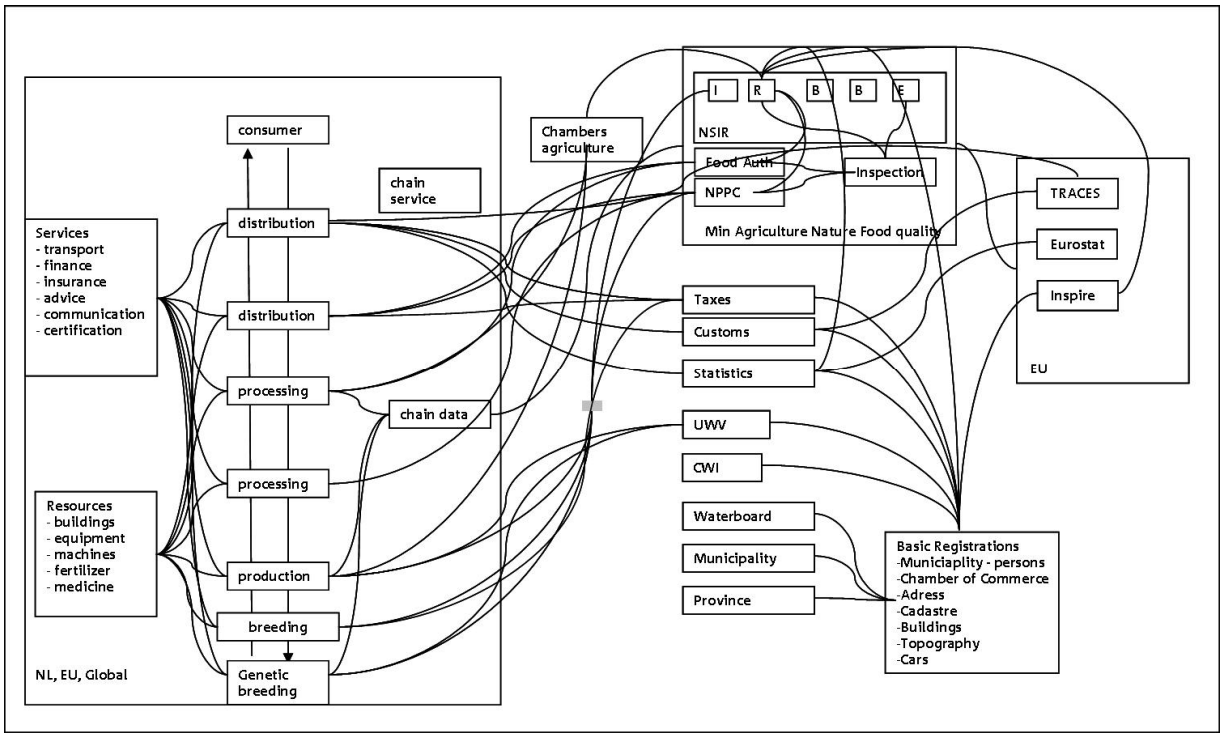

Fig. 4 A 'spaghetti schema', based on a study in the Netherlands, which illustrates the complexity of data exchange between different parties in agricultural systems (source: Frans van Diepen in presentation during CENAgro meeting, Brussels, 2008).

This schema illustrates some of the complexity of the relations between the different actors in the agricultural sector. In reality, the situation is usually still more complex.

Conclusion 2
Information sharing in agri-food is a complex issue because many aspects and dimensions play a role. An installed base of information systems lack standardization, which hampers efficient exchange of information. This leads to inefficient business processes and hampers adoption of new knowledge and technology.

Livestock farming including ISO-Agrinet
For livestock production, exchanged data are numerous and various. Data exchange exists between farmers and breeding organizations such as milk recording agencies, artificial insemination cooperatives and herd books. Different EU regulations result in flows between the farmers and the governments, for animal traceability (e.g. in cattle registration), and between farmers and their suppliers for chain food information requirements. The increasing use of automatic devices on farm such as automatic feeders, automatic milking systems (AMS), results also in an increasing need for communication between these devices and on-farm management information system. Within the farm system, especially in dairy operations, there is a need to integrate data from different systems: feeding, milk performance, milk composition (quality), reproductive performance, health, heifer rearing (again, feeding, performance, reproduction.).
In the future, the situation could become more complicated with the possible development of sensors connected with on farm management system by electronic identification (for example through RFID). In addition, livestock farmers have, like arable farmers, to cope with data exchange for field information (spatial data). For these different cases, different standards exist maintained by different bodies at different levels, but without any coordination: ISO, government agencies, UN/CEFACT, national and international EDI associations. There is no general view of the needs from the farmer's point and the different systems are usually not interoperable. The major part of the standards is focused on data dictionaries and message structure. They do not take into account the specific farmers business requirements. In other words, they are not always based on or build upon real business processes. This results in an extra burden of administrative work.

Arable farming and precision agriculture
In arable farming, machines play an important role. Data Exchange between machines at field level and management systems at farm level is supported by an extensive and widely adopted ISO standard (ISOBUS/ISO11873). However, data exchange between different systems at farm level is insufficient. Some examples of some point-to-point interfaces are found, but there are no common standards for data exchange at this level of integration. Information exchange between farm and other actors (e.g. advisors, government, processors) is also not sufficiently organized (Wolfert *et al.*, 2009).
One path to put sustainable agriculture into practice in plant production is to improve its processes through better process control, so called precision agriculture (PA). This includes better accuracy in timing and spatial allocation of task execution. New automation, ICT and GIS technologies provide solutions for steering and controlling site-specific production systems to fulfill requirements of safe, efficient, environment friendly and traceable production. Good quality and ease for efficient performance of work tasks require, however, organizing a user-centered on-line support. Not only task execution but also the task planning in PA needs support. Efficient connections to support services are essential. To run data

analysis and planning models, service providers need connections and data transfer between numerous data sources.
To enable compatibility between different system parts that are needed in performing PA, an information management system which utilizes open system interfaces and ICT standards, such as ISOBUS, and efficient data transfer are required. At the moment, PA information management is based on PC software solutions, and data transfer between the management system and mobile unit takes place by memory cards or sticks. Often, data transfer takes place in different versions of the proprietary ESRI 'Shapefile' format. However, a cost efficient solution for arranging support in task execution (task download, documentation upload) in the field is to maintain a wireless internet based remote support system, which can be used for communication between several parties (Pesonen et al., 2008). In this kind of systems data transfer takes place in XML format, organized using standardized schemas. Steps in this development direction have already been taken with success (e.g. www.bitcomp.fi.).
Real-time support, automated assistance and robotics in PA require distributed computing. Efficient data exchange is a fundamental requirement for such distributed data processing. Therefore, there is a need to harmonize or standardize data transfer formats, and to some extent also data models, for better economic efficiency.
Closely related to precision agriculture and an important technological aspect of the monitoring of agriculture production is real time integration of *in situ* sensor measurement, remotely sensed data and tools for precision farming and agro-meteorological modeling in decision support systems for farmers. This integration requires deep knowledge of areas such as sensor protocols, handling of sensor data in an internet infrastructure, agro meteorological modeling, etc. Another crucial element is interoperability across the information flow chain and the need to guarantee modularity of all solutions with the possibility to replace, add or modify single components and the applicability to multiple agriculture scenarios. Current issues in the use of sensors are:

- the immediate access to information and the rapid communication to farmers are the base for efficient decision making during crop production;
- the use of wireless sensor networks could contribute to increase quality and effectiveness of agricultural production. Sensors could be also installed in vehicles or even can be carried around in the field by personnel involved in surveillance and other activities;
- the sensor interfaces and application services may need to interoperate and may need to be bridged at any of many locations in the deployment hierarchy;
- large-scale sensor networks impose energy and communication constraints, thus it is difficult to collect data from each individual sensor node and process it at the sink.

The integration of sensor networks within the web environment may be based on a standards stack defined by the Open Geospatial Consortium (OGC) initiative called Sensor Web Enablement (SWE).

Conclusion 3
Standardization of data exchange for farm management purposes is fragmented, while the need is still growing because of new technologies (precision agriculture, RFID, sensors, etc.). Especially the exchange of information at whole chain or network level is poorly organized. Although arable and livestock farming have their own specific needs, there are many similarities in the need for an integrated approach. Hence, it is advisable to search for generic solutions that are applicable in both sectors.

Spatial data - the Open Geospatial Consortium and INSPIRE

Spatial data increasingly play an important role in society and also in agriculture (e.g. precision agriculture, land parcel identification system (LPIS)). The Open Geospatial Consortium, Inc (OGC) is an international consortium of 368 companies, government agencies and universities participating in a consensus process to develop publicly available interface specifications. OpenGIS® specifications support interoperable solutions that 'geo-enable' the Web, wireless and location-based services, and mainstream IT. The specifications empower technology developers to make complex spatial information and services accessible and useful with all kinds of applications[5].

OpenGIS® Standards and Specifications are technical documents that detail interfaces or encodings. Software developers use these documents to build support for the interfaces or encodings into their products and services. These specifications are the main products of the Open Geospatial Consortium and have been developed by the membership to address specific interoperability challenges.

Implementation Standards are different from the Abstract Specification. They are written for a more technical audience and detail the interface structure between software components. An interface specification is considered to be at the implementation level of detail if, when implemented by two different software engineers in ignorance of each other, the resulting components plug and play with each other at that interface.

The OGC Technical Committee (TC) has developed an architecture in support of its vision of geospatial technology and data interoperability called the OpenGIS. The Abstract Specification provides the conceptual foundation for most OGC specification development activities. Open interfaces and protocols are built and referenced against the Abstract Specification, thus enabling interoperability between different brands and different kinds of spatial processing systems. The Abstract Specification provides a reference model for the development of OpenGIS Implementation Specifications. The OpenGIS® Reference Model (ORM) provides a framework for the ongoing work of the OGC[6].

The OGC works together with the ISO/TC211, and OGC standards are actively being promoted as ISO standards. Major OGC standards such as Geography Markup Language and the Web Map Server Interface have already been accepted as ISO 19136:2007[7] and ISO 19128:2005[8] respectively.

On 14 March 2007, the European Parliament and the Council approved the directive 2007/2/EC for the establishment of an Infrastructure for Spatial Information in the European Community (INSPIRE). The objective of the INSPIRE directive is to improve the availability and integration of spatial data in Europe.[9] INSPIRE identifies five sets of Implementing rules:

- Creation and updating of metadata
- Interoperability and harmonization of spatial data sets and services
- Network services
- Rules governing access and rights of use to spatial data sets
- Monitoring and reporting

[5] http://www.opengeospatial.org/ogc
[6] http://www.opengeospatial.org/standards
[7] http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=32554
[8] http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=32546
[9] DIRECTIVE 2007/2/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)

INSPIRE defines certain rules for organizations that are responsible for public data (eventually also for private organization managing data of private interest). These rules concern the metadata, exchange formats and services, but do they not define any obligatory rules for private domains such as farming. However, the Land Parcel Identification System (LPIS), spatial data which is particularly relevant for agriculture is not regulated by INSPIRE. Furthermore, INSPIRE does not define obligatory rules for member states on how to deal with property rights of spatial data and if spatial data has to be freely available.
INSPIRE therefore currently does not currently appear to be delivering the datasets which are most relevant for agriculture. However, INSPIRE is still in the first phase of development, and it is to be expected that relevant datasets will be made available within the INSPIRE framework in the future. It is therefore important to consider the demands and opportunities presented by INSPIRE when considering data exchange for agriculture.

Conclusion 4
Spatial data increasingly plays an important role in agriculture and the spatial data community is actively developing standards for interoperable data transfer. It is therefore important to consider developments in spatial data such as OGC/ISO standards and INSPIRE.

B.1.1.2 Problem statement

From the previous sections, it can be concluded that farming is faced with increasingly complex requirements for data handling. These data are part of processes at various levels (see Fig. 2). At all levels, there is an installed base of existing information systems. Development of a common data exchange system is thus a matter of integrating these existing systems smoothly. Therefore, an integration framework has to be developed which allows the exchange of different data families, to meet requirements arising from standards and norms (cross compliance), quality assurance schemes or geo-data handling as needed for precision farming. This project should support this development by coordination and networking.

B.1.1.3 Objectives

To improve information sharing in European agriculture, it is necessary to integrate existing information systems. A coordinated action between system developers is needed. In order to take steps forward, a common framework should guide this process. Because of the complexity described in the previous sections, it is necessary that a strategic research agenda is defined to guide the process - step by step - in the right direction. Hence, the main objectives of agriXchange can be defined as:

1. <u>establish a platform on data exchange in agriculture in the EU</u>
   The main target group of the platform are developers of tools (hard- and software) for farmers in which data exchange plays a role. The platform should provide a framework (see objective 2) and guidelines that can be used for national implementation by these developers. Additionally, the platform should function as a community of practice where experiences, use cases and examples can be exchanged. The platform should be supported by scientific research to supply the state of the art scientific insights on which to base solutions on. The platform must be ‘open access’.
   The platform will be gradually setup through several activities. Full functionality is expected to be reached in M20. The success of the platform can be measured by the number of relevant users that are involved and the activities that take place by the platform. Its success is verified by getting feedback form workshops and through the platform itself.

2. develop a reference framework for interoperability of data exchange in agriculture in the EU
   Because each specific field of data exchange (e.g. business transactions, geographical processes) has already its own developed standards and systems and the implementation will always be subject to local-specific conditions, it is unrealistic to suppose that one universal standard model for agricultural data exchange could be developed and used. However, there is a need for a reference framework for interoperability between various subsystems. This framework should also prevent the re-invention of the wheel in each member state.
   The framework will be an integral part of the platform and is gradually developed by implementation of several use cases. A mature reference framework is expected to be ready in M24. It will be tested by implementing a new use case and validated by user groups. An integral validation of the framework and platform takes place by feedback from a workshop and advisory board meeting in M30 and continuously through the platform itself.
   Developing the framework is part of this project, but specific implementation and actual coding of standards, etc, should take place in other (national and regional) projects. The framework should be open to public through the platform (objective 1).
3. identify the main challenges for harmonizing data exchange in agriculture in the EU
   This should lead to a list of recommendations in the form of a strategic research agenda that should lead to activities that sustain the platform and reference framework. A draft report will be ready at M30 so that it can be validated and discussed during the workshop and advisory board meeting and continuously through the platform. The feedback will be processed resulting in a final report in M36.

In this way, a European network is formed that facilitates common data exchange for systems in the agri-food sector.

B.1.1.4 Direction for solutions

Based on experience with information integration in agriculture in the Netherlands, Wolfert *et al.* (2009)have proposed a method that form the approach for this project. Therefore, this method will be briefly described. It is schematically represented in Fig. 5.

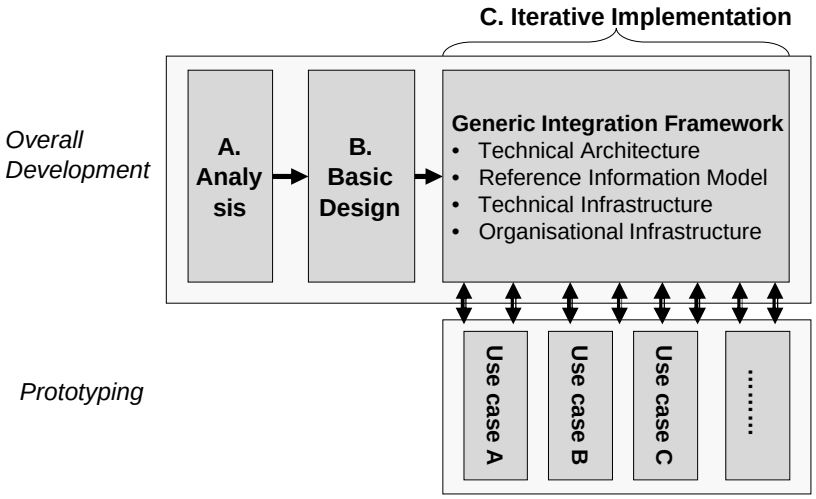

Fig. 5 Method for organizing information integration combining sequential and iterative development (Wolfert et al., 2009)

A key characteristic of the method is a combination of overall development with incremental prototyping. It starts with an overall analysis and basic design of the core system, followed by iterative prototyping in integration pilots. More specifically, the following phases are distinguished:

A. *Analysis*: investigating the existing state of information integration ('as-is') and planning of required improvements;
B. *Basic Design*: designing the core structure that ensures the consistency of specific pilot implementations. It can be subdivided into:
    i) a conceptual technical architecture,
    ii) a generic reference information model,
    iii) a technical communication infrastructure, and
    iv) the institutional embedding (organization).
C. *Iterative implementation*: further development in pilots that each implements a part of the basic design. The pilot results are abstracted to a Generic Integration Framework which encompasses a base of generic design knowledge and the infrastructure that exceeds the level of individual pilots. Consequently, the generic framework serves as a knowledge base of 'best practices' that grows organically.

The phases are briefly described in the next sections.

Framework for analysis
Systematic analysis of the existing situation requires insight in different types of information integration and possible levels of integration. For that purpose, a conceptual framework was defined (among others based on Giachetti (2004)) that is visualized in Fig. 6 and distinguishes between:

- Different integration levels:
    - Intra-enterprise: *within* enterprises to overcome fragmentation between organizational units (functional silos) and systems;
    - Inter-enterprise: *between* enterprises to move from operating as an isolated company towards a virtual enterprise that is integrated in multi-dimensional networks.
- Different integration types:
    - Process Integration: alignment of tasks by coordination mechanisms;
    - Application Integration: alignment of software systems so that one online system can use data generated by another one (interoperability);
    - Data Integration: alignment of data definitions in order to be able to share data;
    - Physical Integration: technical infrastructure to enable communication between hardware components (connectivity).

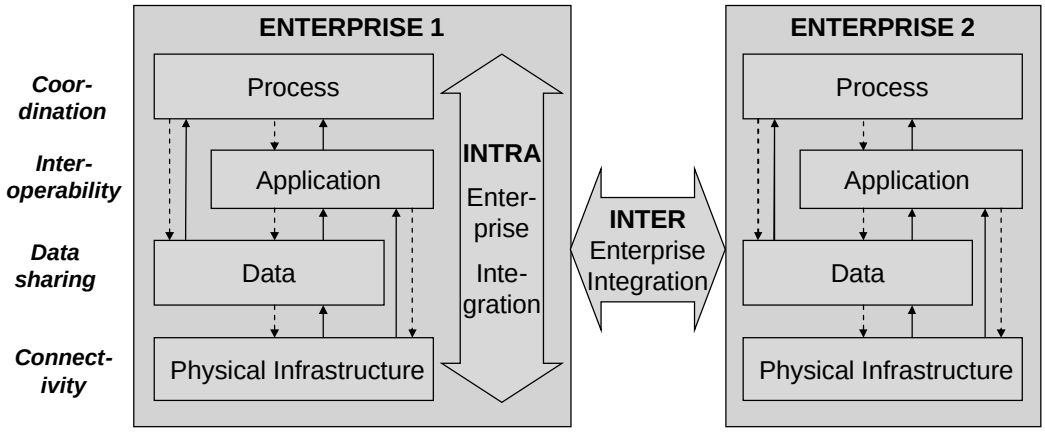

Fig. 6 Integration Framework (adapted from Giachetti (2004))

The different integration types are interdependent in two ways:

Conditional (solid lines): to share data and couple applications, the physical infrastructure must be connected; to integrate applications, there must be common data definitions; for effective process coordination it must be possible to share data or to integrate applications;

Requiring (dotted lines): starting point is the need for integrated processes which defines the requirements for data exchange and application integration; application integration implies specific requirements for data to be exchanged; data exchange and application integration both require a supporting technical infrastructure;

The information integration framework makes clear that information integration can only be solved in a collective manner by the different stakeholders in a chain or network. But that also means that the level of maturity in information integration of each individual stakeholder can be a inhibiting factor.

Basic design

The conceptual technical architecture follows the state of the art in information technology which is a service-oriented architecture (SOA) in which functionality is grouped around business processes and packaged as interoperable services. SOA provides a technical solution to reconfigure business processes on top of existing information systems at companies' own business pace. However, SOA without content is just an empty shell. For that purpose, information models provide systematic representations (visualization, description) of architectures from different viewpoints and at various levels of abstraction. Most important diagrams for modeling chains and networks in a SOA approach are actor models, business control models, business process models and data models. Fig. 7 provides an illustrative example of how a SOA architecture could be implemented in agriculture.

The picture suggests that the existing information systems at the national level can be integrated at the level of business process models connected by interoperable services.

The technical communication infrastructure for this SOA architecture can be supported by enterprise integration software. Leading vendors include IBM (WebSphere), Microsoft (BizTalk, Visual Studio), Tibco, BEA, SAP (Netweaver), Sun (Java Integration Suite), Oracle (Fusion Middleware), webMethods and Cordys.

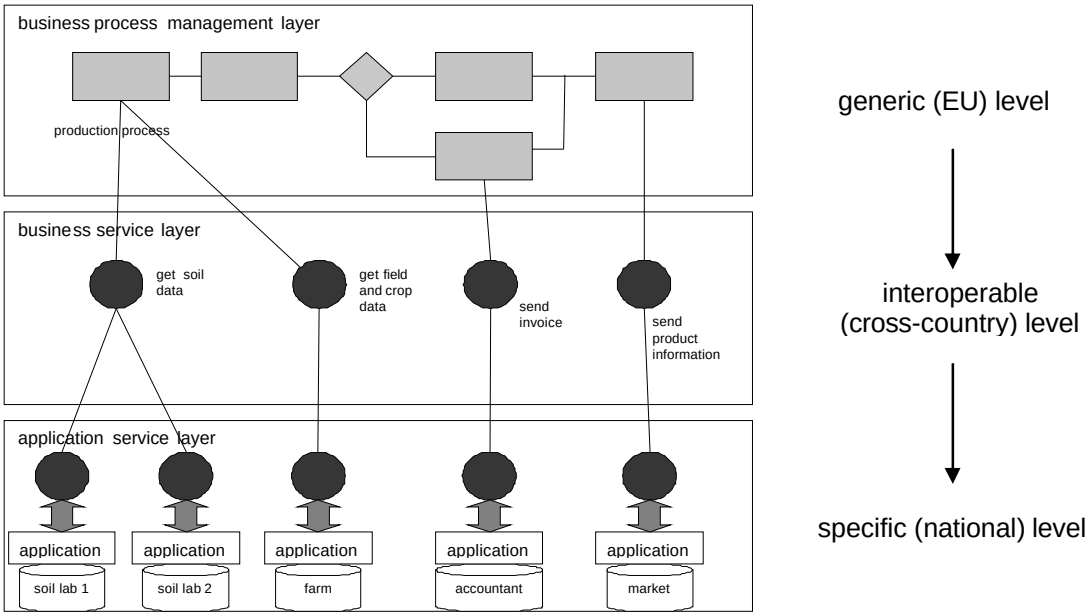

Fig. 7 Three-layered SOA architecture with some illustrative examples of components from the farming sector

However, there are still issues to solve. Criticism on SOA currently mentioned includes poor cross-platform interoperability in practice and high complexity of underlying protocols leading to the inability to implement SOA on the small and medium sized enterprises (SME) level. This last point is crucial for adoption in agriculture. It is also a critical success factor that the architecture and infrastructure are widely accepted and used by all actors. Important organizational issues include:

- Creating awareness and commitment for adoption of standards and infrastructure;
- Financing the basic design and on-going development and maintenance, including allocation of decision and property rights and risks and rewards;
- Enabling a user-driven innovation and research: businesses themselves must take the lead and all relevant stakeholders should be involved;
- Embedding standards in formalized international standardization bodies.

Iterative implementation in Living Labs

In the next phase use cases are conducted in which satisfying solutions are provided, based on the long term vision of the basic design. The results of every use case are incorporated into the generic framework. This combination of short term solutions and foundation on a long-term vision, is referred to as 'the golden egg'. The more pilot projects (eggs) are based on the generic framework, the better the design becomes, and it grows organically towards a mature design (the chicken) that becomes gradually more and more supported. To organize this organic growth development, a Living Lab (LL) approach is proposed. LLs represent a user-centric innovation approach for sensing, prototyping, validating and refining complex solutions in multiple and evolving real life contexts. LLs promote an alternative innovation paradigm: the end-user's role shifts from research object to a pro-active position where user communities are co-creators of product and service innovations. The LLs concept should be distinguished from other approaches such as test beds (laboratory environment), field trials (test of a technology or application in a limited but still real-life environment). In a LL approach, a use case follows six stages:

1. sensing,
2. identifying individual services and business needs,
3. prototyping,
4. testing new solutions,
5. pre-market validation for the usability and
6. piloting for the market entry.

The concept of Rural Living Lab (RLL) was introduced by the EU-FP6 project Collaboration@Rural (C@R). Two partners from this consortium (P5 WRLS and P13 EFITA) participate in this project so agriXchange can directly benefit from the results.
In Fig. 8, a successful example of a living lab in the Netherlands is described.

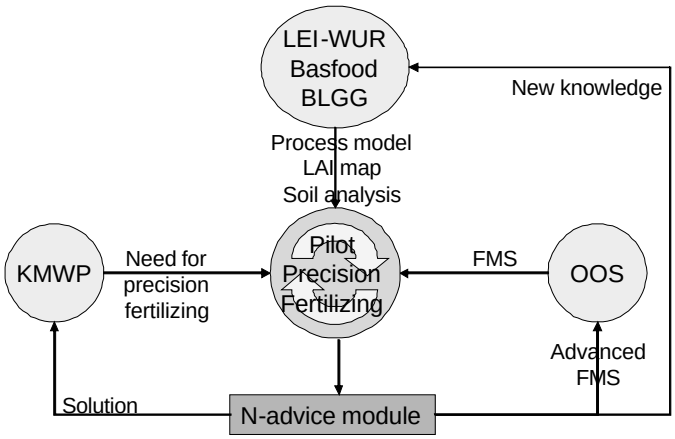

Fig. 8 Example of a living lab on precision fertilizing

Several partners are involved in this precision fertilizing pilot. The companies Basfood and BLGG provide the LAI map and the soil analysis information that is needed as input for precsion fertilizing.. This means that their applications are connected to the N advice process via external web services. As Farm Management System (FMS) the product 'Imhotep' of Ordina Oracle Solutions (OOS) is involved. The farm 'Koninklijke Maatschap de Wilhelminapolder (KMWP)' is involved as agri-food business partner, delivering the business case. Research institute 'LEI-WUR' is the partner delivering knowledge about business process management and service-oriented architecture.
Other living labs from the C@R project that are interesting to agriXchange to be mentioned are:

- Wirelessinfo, focusing on all agriculture and food production and utilization of the newest web technologies in the agri-food sector.
- Frascati, dealing mainly with Earth Observation, Sensors and SDI for vinery production.

B.1.1.5 State of the art

In most EU member states, standardized information exists because of national or European legislation (e.g. FADN, LPIS, etc). Usually, this serves only policy making. With respect to agri-food business, standardization is already relatively well organized in France, Germany and The Netherlands. In this project, the situation in these three countries can be used for two purposes. First, they can serve as a proof of concept of how existing national standards can be

harmonized at an international level. Secondly, they can provide elements and guidelines to other member states on how to implement standardization of data exchange at a national level. In this section, the state of the art in these countries will be briefly described.

The Netherlands
The Netherlands have a strong position in the international trade and transportation of agricultural and food-related products; Hence, international standardization of data exchange is an important condition for efficient, cost effective, processing. Electronic Data Interchange (EDI) was initiated in de Netherlands in the 1980's by the Agricultural Telematics Centre. An important step was the development of the Agricultural Data Interchange Syntax (ADIS) for the exchange of data between computer applications, as well in mobile as in stationary equipment. For the actual exchange of the data between farmers and their business partners, an X400 mailbox-system was used. During recent years the use of the ADIS-syntax has migrated towards the XML-syntax and for the exchange of the data, web service-technology is introduced to replace X400 and e-mail applications.
Dutch agricultural companies increasingly operate at a European and global scale. International standardization of messages and exchange-protocols is becoming more important.
In the Netherlands, about 30% of arable and poultry farmers, 80% of pig farmers and up to 90% of dairy farmers and farmers in horticulture and flowers, exchange management data electronically on a daily or weekly base.
In horticulture and flowers, mainly trade- and transport-related data is exchanged at a global scale. The messages that are used are standardized at an international level with the support of GS1 (Global Standards One) and are related to the UN/CEFTACT standards. In other agricultural branches, e.g. in pork farming, national standards (ADIS-bases) are still used.
There are standard messages for:

- Animal farming in general:
  - identification and registration data (I&R-data) from farmers, traders and transporters to the national services of the ministry of agriculture;
  - data concerning supplied feedstuff from feedstuff suppliers towards farmers and accountants.
- Pig farming:
  - breeding information from farmer to breeding organizations and vice versa;
  - slaughter data from slaughterhouse tot pig farmers;
- Dairy Farming:
  - breeding information from breeding organizations towards dairy farmers;
  - delivery information (quantity, quality, payment) from the dairy forms towards dairy farmers;
- Arable farming:
  - technical cropping information and data about the land use from farmers to the industry and to national services of the ministry of agriculture.
- Horticulture:
  - data concerning quality programs (e.g. the use of chemicals) and quantities to be delivered form farmers to auctions.
  - payment information from auction to farmers.
- Trade:
  - invoices, order messages, delivery data, data concerning quality checks and pricing.

The maintenance of these standard messages in the Netherlands is taken care of by several specialized EDI-Associations, that closely work together under the umbrella organization EAV (EDI Agro Association).

A future challenge is a stepwise migration towards international standards (UN/CEFACT, GS1, etc.), based on XML-messages. First, the focus should be on integrating business processes of different firms and companies by exchanging data, using standard XML-messages and the web service protocol (based on a service-oriented architecture). To achieve this, European collaboration is considered to be important, under the umbrella of UN/CEFTACT and GS1. A good example of such an approach are the current CEN ISS EEG14/TBG18 and the UN/CEFACT TBG18 agriculture working groups that focus on the cross-border exchange of the animal passport and on standardization of the exchange of spatial data in arable farming. Several Dutch organizations are participating in the CEN and UN/CEFACT working groups

Germany
In Germany, several initiatives for data exchange touching agricultural issues exist. The most prominent ones are on the one hand the ISO initiatives ISOBUS and ISOagriNet and on the other hand agroXML.
The ISOBUS covers exchange between tractors and machinery and allows for logging work activities and loading processing instructions onto controllers on agricultural machines. It builds upon the CAN-Bus commonly used in automotive applications and thus doesn't play a role in Internet data exchange, although its data format offers an XML serialization which could be embedded into other XML documents. It is currently in the state of being implemented by the major machinery providers.
Parts of ISOagriNet are internationally standardized, the data dictionary accompanying it is divided into an international and a national set of entities. Those entities currently cover mainly livestock farming. Due to large scale applications in milk recording, the data dictionary in this area is especially well worked out.
Whereas ISOagriNet provides a complete protocol stack for record-oriented data exchange, suitable for very large data volumes and hardware low on resources such as micro-controllers, agroXML provides for document-oriented data exchange using web technologies such as linking and markup language and existing standard web protocols such as HTTP. It is developed by the KTBL under supervision of a committee and working groups consisting of representatives of the major farm management information system providers in Germany and other research and extension organizations interested in data exchange. It defines a set of documents, which can either be used in a modular manner for resource oriented data exchange in web services or be used as a stand-alone all-inclusive document for documentation purposes. Profiles allow for subsets to be extracted and content lists provide the vocabulary for elements with a constrained but dynamic set of values.
In plant production, agroXML covers most of the aspects necessary for exchanging arable farming data. Data schema definitions for livestock farming are currently being developed in collaboration with ISOagriNet stakeholders. agroXML is used in communication between farm management information systems and external partners and information providers. Applications currently worked on can be found in annex I.

France
For large crops, within Agro EDI Europe, a French national association of ICT companies, R&D institutes, services organizations, agri-food enterprises different working groups are producing well-accepted standardized exchange messages. For animal production, a national

standard has been established for more than ten years and maintained for animal traceability purpose by Institute de l'Elevage. It consists of about 300 data elements and 40 types of messages. This standard is widely used both by farmers and industry; About 40 million of these messages are created each year; For data exchange between stationery equipments and on farm management systems, the ISO standards remain a useful reference. Apart from these standards several particular systems exist as a result of limited agreements.
The latest developments are:

- the development of dictionaries of concepts with the precise definition of many agricultural objects (e.g. plot or field) within the GIEA project;
- the adoption of XML as a standard for all new messages (EDI and plain text files were used until now);
- the initiative to create an international working group within UN/CEFTACT, dedicated to agriculture and food industry problems (Task Business Group 18);
- the effort to obtain the international normalization within UN-CEFACT of the message describing plots (fields) and all actions performed in fields (product traceability). At first, the interest in such international normalization was weak, but it is believed that this normalization will secure investments without limiting the backlash since there are two elements in a normalized message: an internationally agreed structure and a 'user guide' describing for each country localized information tables (e.g. soils descriptions, lists of fertilizers or chemicals, etc.);
- as UN/CEFTACT working groups are using the software application 'Enterprise Architect', French actors decided to adopt this tool to describe their data and create messages (see: http://www.sparxsystems.com.au/);
- from January 2009 (and for two years), ACTA Informatique and Agro EDI Europe together with Institut de l'élevage and others partners intend to organize working groups dedicated to water, inputs and energy. French partners of the agriXchange project will be happy to open these groups to other partners interested not only in product traceability but in agro-environmental traceability;
- some of the French actors are very much interested in ebXML that guarantees the transmission and the authenticity of messages, and enables to convert when necessary data formats according the requirements of senders and receivers. Test beds were performed in 2008. This technology may replace the classical EDI technology and will be used to exchange new messages.

B.1.2 Quality and effectiveness of the support mechanisms and associated work plan

B.1.2.1 Overall strategy and general description

The overall strategy basically follows the method that was described in section B.1.1.4, with the addition that this project should have a EU-wide scope in which coordination and networking function play a dominant role. From this, we propose 6 work packages, each defined to address specifically the key objectives as defined in section B.1.1.3.

WP1 Project coordination and management
addresses the project management and scientific co-ordination tasks, including internal communication, quality management, time planning, reporting and financial control.

WP2 Analysis of current situation in EU-27 and Switzerland
analyses the situation concerning data exchange in agriculture in EU member states (incl. Switzerland). The framework for analysis, as defined in section B.1.1.4.1, forms the backbone. Together with input from WP4 on specific topics, it will result in specific recommendations at a national level. Additionally, general recommendations will be defined, which are input for WP5. The analysis uses existing networks such as EFITA (see annex IV), and is supported by WP6. Results will be disseminated through the platform of WP3.

WP3 Set-up of agriXchange platform
supporting the agriXchange community to share knowledge and standards during and after the project. It will be based on criteria that are taken from desk research, but also on results from the analysis of WP2. The platform will be internet-based and is used to carry the framework that is developed in WP4.

WP4 Development of a reference framework for interoperability
develops the basic design of the integrative framework and continues with the iterative development of the architecture and infrastructure as described in section B.1.1.4. Criteria, derived from the analysis of WP2 will be used. Implementation will be done according to a living lab approach in which three representative use cases are elaborated. The platform of WP3 will function as a collaborative working environment. A fourth use case will be used to verify the framework.

WP5 Synthesis, recommendations and defining of the SRA
synthesizes the results from WP2, WP3 and WP4 defining a strategic research agenda for follow-up activities of this project. It is important that the SRA is supported by all stakeholders.

WP6 Stakeholder integration and dissemination
coordinating stakeholder involvement and obtaining broad support from the user's community. This is done in close cooperation with the other WPs and in this way functions as a kind of integrating work package. A series of workshops, where the work and all relevant stakeholders come together, forms an important basis. Existing networks (e.g. EFITA) and contacts of all consortium partners are used for as well receiving input as dissemination of the project results. An advisory committee is set-up for getting explicit advice on project plans and strengthening ties for future support.

Fig. 9 provides a graphical representation of the interdependencies between the different work packages. Although WP2, WP3 and WP4 will be set-up at the same time, WP2 will be provide the initial input for the agriXchange platform and the reference framework will be developed using the platform, so there is still a certain interdependency in time between these work packages. In the end, WP2, WP3 and WP4 deliver the necessary input for WP5. WP6 is a work package that continuously interacts with the other work packages: stakeholders are involved in the different activities and results are communicated with them. WP1 is continuously supporting to all other work packages.

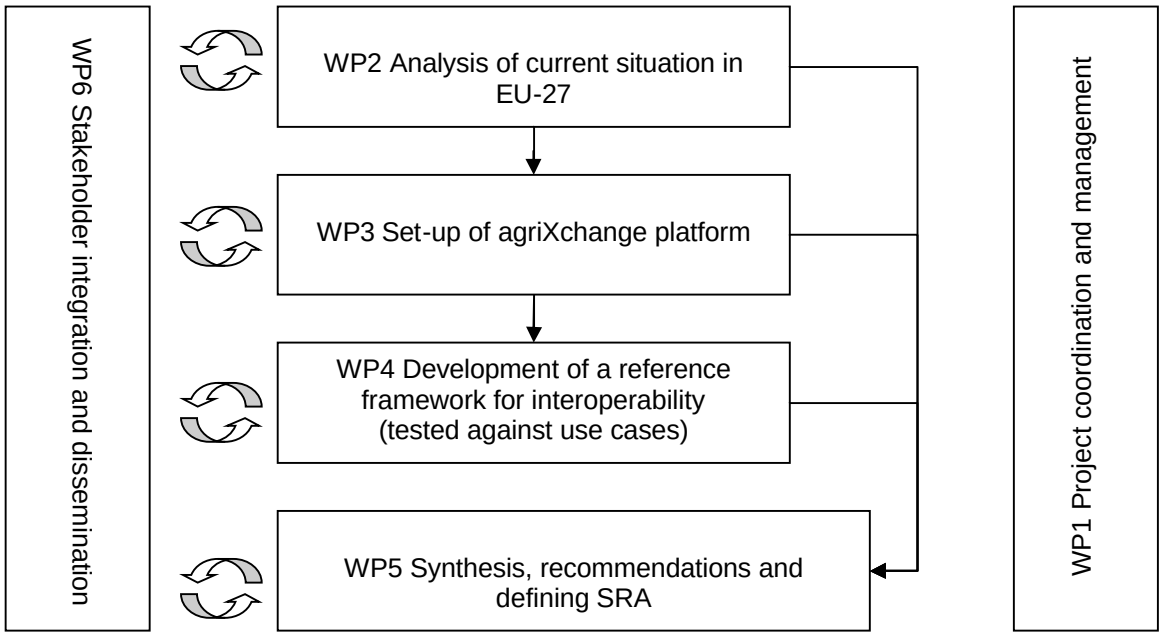

Fig. 9 Diagram of the work packages and their interdepencies

Risk management - internal factors that hamper achieving the project results

During the project, there might be possible risk factors that can hamper the achievement of the objectives and results. Basically, the risk is reduced already by a well-thought project plan and the professional capacity of the consortium partners. Nevertheless, Table 1 lists possible risk factors and indicates what the possible effect on the result can be and what measures are taken. External risk factors will be provided in section B.3.1.4.

Table 1 Internal risk factors, the possible effects and measures that are taken

nr.	risk factor	impact	effect	measure
1.	low interest and number of participants at workshop	high	- poor stakeholder interaction - poor dissemination and adoption of the results	- workshops are combined with other events or projects (e.g. FutureFarm) - workshops are made attractive for participants - financial stimuli are used
2.	sustainability of the agriXchange platform	high	- results are poorly adopted after the project - expected impact is not reached	- write a business plan - get support from stakeholders from the beginning - make the platform a critical factor in developing systems for agriculture
3.	investigation in EU countries takes too much time	medium	- time delay in the project	- work in focus groups - actively involve persons from different countries - use the right networks
4.	low commitment (some) of the consortium partners	medium	- planning and execution of certain tasks is delayed - results are of low quality	- consortium agreement is defined before the start of the project - regular project meetings - obligatory progress reporting
5.	misbalance in progress and quality of results	medium	- progress is to slow, because project goes to deep - results are not soundly based	- project planning and monitoring - review by senior researchers and peers - feedback of stakeholders (e.g. during workshops)
6.	not enough orientation on business process approach	medium	- results are too technical - poor integration of standards - poor adoption of results by stakeholders	- inclusion of researchers with background in business process modelling - interaction with stakeholders from agri-food business
7.	project coordinator	low	- planning and execution of	- at the same organisation (LEI-WUR)

	disappears from the project		tasks is delayed - continuation of the project is in danger	there is a reserve project coordinator with similar seniority and experience on the subject - within the core consortium there is enough capacity to take over

At the start of the project, this list will be discussed and modified/extended when necessary.

B.1.2.2 Timing of work packages and their components

The Gantt chart in Fig. 10 shows the timing of the project tasks in each work package and the various meetings which are planned.

	Year 1												Year 2												Year 3											
work packages and subtasks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
WP 1 Project coordination and management																																				
1.1 Preparation of Consortium Agreement																																				
1.2 Organization of project meetings for all partners																																				
1.3 Preparation project web for internal communication																																				
1.4 Project co-ordination, management, administration, supervision and quality control																																				
1.5 Communication with EU Commission, DG Research and other relevant DGs																																				
1.6 Preparation of yearly scientific and financial reports																																				
WP 2 Analysis of currrent situation in EU27																																				
2.1 In-dept analysis of data exchange																																				
2.2 Investigating the state of the art on agricultural data exchange in EU-27																																				
2.3 Investigation of other future based information structures																																				
2.4 Recommendations on organizing data exchange and reporting																																				
WP 3 Set up of agriXchange platform																																				
3.1 Analysis of criteria to develop the platform																																				
3.2 Create a website 'agriXchange.org' with appropriate functions																																				
3.3 Building contents and community																																				
3.4 Feasibility study on self-supporting continuation of the platform and reporting																																				
WP 4 Development of a reference framework for interoperatibility																																				
4.1 Elaboration of the methodology for framework development																																				
4.2 Analysis of selected use cases																																				
4.3 Development of the reference framework																																				
4.4 Verification of the viability of the reference framework																																				
4.5 Harmonizing data exchange																																				
WP 5 Synthesis, recommandations and defining of the SRA																																				
5.1 Preparing draft of strategic research agenda																																				
5.2 Validation of SRA by stakeholders																																				
5.3 Defining final SRA and reporting																																				
WP 6 Stakeholder integration and dissemination																																				
6.1 Set-up of contact lists of relevant stakeholders																																				
6.2 Organizing project workshops																																				
6.3 Set-up advisory committee and organize meetings																																				
6.4 Disseminate the results by external communication																																				
meetings																																				
workshops												WS								WS										WS						
project meetings	PM						PM								PM								PM							PM						
advisory committee	AC																													AC						
steering committee	SC						SC								SC								SC							SC						

Fig. 10 Gantt chart of the project

B.1.2.3 Work package list/overview

No	Title	Type of Activity*	Lead Participant No	Lead participant short name	Person-months	Start month	End month
1	Project coordination and management	MGT	1	LEI-WUR	10	1	36
2	Analysis of current situation in EU-27 and Switzerland	SUPP	2	ASG-WUR	23.5	2	16
3	Set-up of agriXchange platform	SUPP	3	KTBL	20.5	1	30
4	Development of a reference framework for interoperability	SUPP	4	MTT	31	2	34
5	Synthesis, recommendations and defining of the SRA	SUPP	5	WRLS	15.5	24	36
6	Stakeholder integration and dissemination	SUPP	13	ACTA Info	15.75	1	30
				TOTAL	**116.25**		

* MGT = Management of the consortium; SUPP = Support activities

B.1.2.4 Deliverables list

Del. no.	Deliverable name	WP No.	Lead beneficiary	Estimated indicative person-months	Nature	Dissemination level	Delivery date
D1.1	Minutes of project meeting 1 of the consortium	1	LEI-WUR	0.1	R	CO	2
D1.2	Minutes of project meeting 2 of the consortium	1	LEI-WUR	0.1	R	CO	8
D1.3	Minutes of project meeting 3 of the consortium	1	LEI-WUR	0.1	R	CO	16
D1.4	Minutes of project meeting 4 of the consortium	1	LEI-WUR	0.1	R	CO	22
D1.5	Minutes of project meeting 5 of the consortium	1	LEI-WUR	0.1	R	CO	31
D1.5	Internet web site for internal and external communication, project leaflet, slide presentation of the project (short and long version)	1	LEI-WUR	1	O	CO	2
D1.6	Detailed time schedule and work plan for the project	1	LEI-WUR	1	R	CO	2
D1.7	15 months scientific and administrative project report including cost statement	1	LEI-WUR	0.5	R	PU/CO	12
D1.8	36 months scientific and administrative project report including cost statement (final report)	1	LEI-WUR	0.5	R	PU/CO	36
D2.1	Draft chapter of the results of the in-depth analysis	2	ASG-WUR	2	R	RE	3
D2.2	Research methodology, including inquiry template, for investigating the state of the art in EU-27 and Switzerland	2	ASG-WUR	2	P	RE	4

D2.3	Draft chapter of investigating the state of the art in EU-27	2	ASG-WUR	2	R	RE	10
D2.4	Final report	2	ASG-WUR	2	R	PU	16
D3.1	Report of criteria analysis	3	KTBL	1	R	PU	3
D3.2	Website + specific tools	3	KTBL	2	O	PU	6
D3.3	Community of practice (#people, #meetings, discussions)	3	KTBL	6	O	PU	30
D3.4	Report on business model for long-term sustainability	3	KTBL	1	R	PU	20
D4.1	Detailed setup and work plan for the design and development of the reference framework, and requirements for the WP2 analysis considering data needs in WP4	4	MTT	1	R	RE	3
D4.2	Criteria for use-case specification and documentation for data exchange harmonization	4	MTT	1	R	PU	6
D4.3	The first version of the basic design	4	MTT	2	P	PU	16
D4.4	Information models of the three selected use-cases	4	MTT	4	P	PU	20
D4.5	Report describing the reference framework; design and verification	4	MTT	2	R	PU	24
D5.1	Draft of SRA 'Common Basis for policy making for introduction of innovative approaches on data exchange in agri-food industry'	5	WRLS	1	R	RE	30
D5.2	Final SRA 'Common Basis for policy making for introduction of innovative approaches on data exchange in agri-food industry'	5	WRLS	1	R	PU	36
D6.1	List of contacts in all countries to be used for WP2 - WP5	6	ACTA info	0.5	R	PU	3
D6.2	report from workshop 1	6	ACTA info	0.5	R	PU	14
D6.3	report from workshop 2	6	ACTA info	0.5	R	PU	22
D6.4	report from workshop 3	6	ACTA info	0.5	R	PU	32
D6.5	minutes from advisory committee meeting 1	6	ACTA info	0.1	R	CO	8
D6.6	minutes from advisory committee meeting 2	6	ACTA info	0.1	R	CO	32
	TOTAL			**36.2**			

R = Report, P = prototype, D = demonstrator, O = other
PU = public, PP = restricted to other programme participants (including the Commission Services), RE = restricted to a group specified by the consortium (including the Commission Services), CO = confidential, only for members of the consortium (including the Commission Services)

B.1.2.5 Description of work packages

WP 1				**Start date or starting event:**		M1-M36			
Title:	Project coordination and management								
Activity Type:	Management of the Consortium (MGT)								
Participant number :	1	2	3	4	5	6	7	8	9	10
Participant short name	LEI-WUR	ASG-WUR	KTBL	MTT	WRLS	ELEV	IRTA	TEAG	ROST	FIBL
Person-months per participant:	10	0	0	0	0	0	0	0	0	0
Participant number:	11	12	13	14						
Participant short name	ALTA	PULS	ACTA Info	PROG						
Person-months per participant:	0	0	0	0						

Objectives:

O 1.1 Efficient co-ordination and management of the scientific and administrative work of the consortium.

O 1.2 Efficient communication between partners and with the Commission.

O 1.3 Quality management

O 1.4 Timely reaching of milestones and timely delivery of deliverables plus yearly project reports/cost statements.

O 1.5 Regular control of the budget and finances

Description of work:

This work package addresses the project management and scientific co-ordination tasks, including communication and dissemination, quality management, time planning, reporting and financial control. It is divided into the following subtasks:

Task 1.1 Preparation of Consortium Agreement (recommended, but not obligatory by EU)

The purpose of this Consortium Agreement is to facilitate the fulfillment of the research work and related services and activities allocated to the Parties under the contract by setting forth the terms and conditions pursuant to which the parties agreed to function and cooperate in the performance of their respective tasks under the contract.

Task 1.2 Organization of project meetings for all partners

Central part of the co-ordination of project collaboration and decision making is the series of five project meetings, which include a continuous monitoring and evaluation process. The project coordinator will organize the regular meetings including the careful and timely preparation of the agenda, meeting material and the minutes. The latter are formal documents binding for all project partners.

Task 1.3 Preparation of project web site and data archive and discussion lists for internal communication

The regularly updated web-site is of central importance for the internal communication of the project (external communication is done by WP6). To avoid inefficiencies, the same website for the platform that is setup in WP3, will be used. The website supports internal information, communication, data transfer and knowledge management with system accessible through the controlled-access section of the web-site. The project coordinator provides the means required to manage and support the web-site and database. All partners will have immediate and unconfined access to all project results. The web site will also act as a data archive for the project, which will be maintained by LEI-WUR for 10 years from the end of the project.

Task 1.4 Project co-ordination, management, administration, supervision and quality control

The general administration and co-ordination of the project includes monitoring of the overall project progress and management of communication and knowledge transfer between partners and the EC. Co-ordination and administration will be carried out according to the operational plan of the project. The quality management system will be based on current practice at LEI-WUR (ISO9001-certified) and the standard operating procedures developed in other projects. These cover organization of meetings, internal peer-review of questionnaires, work guidelines, reports and other deliverables, communication, annual reporting etc.

Task 1.5 Communication with EU Commission, DG Research and other relevant DGs

There will be a regular contact with responsible persons from the EU about the progression of the project. This is partly being done by the formal planned meetings and reports to be delivered and partly on ad-hoc basis if necessary.

Task 1.6 Preparation of yearly scientific and financial reports including collection of external audited project cost balances from the other partners

There will be a yearly official reporting according to the EU project regulations.

The overall organization of the dissemination of project results to end users and the public is a further important task being coordinated by WP1, where some specific activities are organized in WP6. The dissemination strategy has to address four different user groups separately: (i) EC officials and policy makers, (ii) regional and national administrative bodies, (iii) regional and national organizations of data exchange and (iv) the scientific community. Project results will be processed and compiled according to the specific requirements of these user groups, which will differ in terms of content, degree of detail, language and communication means. Electronic means, reports, manuals and scientific publications will be employed to disseminate results. Workshops and conferences will also be part of this process.

Role of participants:

LEI-WUR: overall project coordination
other partners: contribute to project meetings
Other coordination tasks are done at WP or country level

Deliverables:

D 1.1 Minutes of project meeting 1 of the consortium (M2)
D 1.2 Minutes of project meeting 2 of the consortium (M8)
D 1.3 Minutes of project meeting 3 of the consortium (M16)
D 1.4 Minutes of project meeting 4 of the consortium (M22)
D 1.5 Minutes of project meeting 5 of the consortium (M31)
D 1.5 Internet web site for internal communication and dissemination (M2)
D 1.6 Detailed time schedule and work plan for the project (M2)
D 1.7 15 months scientific and administrative project report including cost statement (M15)
D 1.8 36 months scientific and administrative project report including cost statement (final report) (M36)

WP 2				**Start date or starting event:**		M2 - 16			
Title:	Analysis of current situation in EU-27 and Switzerland								
Activity Type:	Support Activities (SUPP)								
Participant number :	1	2	3	4	5	6	7	8	9	10
Participant short name	LEI-WUR	ASG-WUR	KTBL	MTT	WRLS	ELEV	IRTA	TEAG	ROST	FIBL
Person-months per participant:	0.5	5	2.5	2.5	2.5	2.5	1	1	0.5	1
Participant number:	11	12	13	14						
Participant short name	ALTA	PULS	ACTA Info	PROG						
Person-months per participant:	2.5	1	0	1						

Objectives:

As a baseline for work packages 3, 4 and 5, it is important to know about the state of the art in the field of agricultural data exchange. What are the issues and needs in general and, in more detail, what is the current situation in the different EU member states? Hence, the objectives for this work package can be identified as:

O 2.1 In-depth insight into the European information, communication & technology issues and needs in agriculture
O 2.2 To get an overview of the state of the art of agricultural data exchange in EU-27 + Switzerland and identify gaps
O 2.3 Define recommendations on how data exchange could be set-up and organized in countries
O 2.4 Define recommendations (headlines) for preparing the Strategic Research Agenda in WP5

Description of work:

Task 2.1 In-depth analysis of the issues and needs of problems of information, communication & technology in agriculture (M2 – M3)
The current and future problems, challenges and demands of ICT in agriculture will be investigated. These will be derived from the main issues on the European agenda and will cover economic (market), environmental, social aspects. The analysis will be carried out by means of literature review. The analysis will result in a structured list of topics that forms the basis for the inquiry in EU-27 + Switzerland in task 2.3.

Task 2.2 Investigation other future based frameworks outside the agricultural sector (M10 – M14)
ICT infrastructure development and demands are not specific for agriculture only. Future based frameworks will certainly be integrated or related with frameworks (infrastructures, etc.) of other branches. In this task, it will be investigated how other ICT infrastructures function and to understand the way agricultural infrastructures are related to relevant other sectors.
For collecting data and presenting, the platform (WP3) will be used as well.

Task 2.3 Investigating the state of the art of agricultural data exchange in the EU-27 and Switzerland (M3 - M14)
The EU member states will be inquired for the current status of agricultural data exchange in their country. This will be done by desk research, interviews by phone/e-mail using a standard template that is derived from task 2.1; this will make comparison possible. EFITA, as a general network of ICT workers in Europe, and other specific networks will be used. A positive side-effect of this activity is that potential stakeholders from all parts of the EC will be contacted to be involved in this investigation. This can be used in other work packages, especially WP6, stakeholder integration and dissemination. To work efficiently, the main work is carried out under responsibility of 6 members of the consortium that have, by their background, specific relationships with certain countries. Each of them will be responsible for a focus group of countries. Depending on specific circumstances or context of the involved countries different methods can be chosen to carry out the investigations (for example, some countries need probably a more direct approach with a

strong need for involving local language speaking people). Besides the consortium members from the different member states will be used for reviewing. First, the inquiry template will be tested in 3 countries.

The responsible consortium partners are dived over the focus groups by the rule that they have (some) relation with these countries. The focus groups of countries and responsible consortium partners are

Focus group A, leading partner: ELEV (FR)
countries:
1) France
2) Switzerland (non EU member)

Focus group B, leading partner: ALTA (I)
countries - Mediterranean
3) Italy
4) Portugal, Spain
5) Greece, Malta, Cyprus, Bulgaria

Focus group C, leading partner ASG (NL)
countries:
6) UK & Ireland
7) Netherlands + Belgium + Luxembourg

Focus group D, leading partner KTBL
countries:
8) Germany, Austria

Focus group E. leading partner: MTT
countries:
9) Baltic states: Latvia, Estonia, Lithuania
10) Scandinavian states: Sweden, Finland, Denmark

Focus group F. leading partner: WRLS
countries:
11) Poland, Czech, Slovenia, Slovakia, Hungary, Romania

Task 2.4 Basic recommendations on organizing data exchange in agriculture at a national and general level (M11 –M16)
Based on the results of the previous tasks and in relation with WP4 and WP5, a set of recommendations will be provided on how to organize agricultural data exchange at a national level. Besides, more general recommendations will be derived that serve as input (headlines) for the synthesis of WP5. These recommendations will concern as well organizational as technical aspects.
At approximately month 12, an international workshop will be organized to disseminate and discuss the results with a wider audience. Finally, a report of all results will be written.

Role of participants:

ASG-WUR: overall project coordination and focus group leader
ELEV, ALTA, KTBL, MTT, WRLS: focus group leader, analysis, reviewing
LEI-WUR, ROST: only reviewing because other national partner is already involved
other partners: active contribution to analysis for own country, reviewing

Deliverables

D2.1 Draft chapter of the results of the in-depth analysis (M3)
D2.2 Research methodology, including inquiry template, for investigating the state of the art in EU-27 and Switzerland (M4)
D2.3 Draft chapter of investigating the state of the art in EU-27 (M10)
D2.4 Final report (M16)

WP 3				**Start date or starting event:**		M1-M30			
Title:	Set-up of agriXchange platform								
Activity Type:	Support Activities (SUPP)								
Participant number :	1	2	3	4	5	6	7	8	9	10
Participant short name	LEI-WUR	ASG-WUR	KTBL	MTT	WRLS	ELEV	IRTA	TEAG	ROST	FIBL
Person-months per participant:	0.5	1	8	0,5	6,5	0,5	0,5	0,5	0,5	0,5
Participant number:	11	12	13	14						
Participant short name	ALTA	PULS	ACTA Info	PROG						

Person-months per participant:	0,5	0,5	0	0.5						

Objectives:
Focus of this WP is providing support to the agriXchange community, to share knowledge and standards during and after the project. There are three objectives:

O 3.1 Platform design and development - create an internet-based platform that facilitates sharing of knowledge and standards during and after the project.

O 3.2 Management of content - support other WPs and special interest groups that will be established during the project.

O 3.3 Long-term sustainability - develop a model for financial sustainability that enables continuation of the platform after the project.

Description of work:
The Internet and especially the world wide web is playing an increasing role in building and maintaining standards and collaborative knowledge sharing in ICT. Geographically distributed communities – even across the whole globe – use internet technologies to discuss issues, to exchange and manage data models and code and to publish their work to a broader public. Platforms for that purpose currently in use provide functionalities like sharing documents, version control, reporting and feedback mechanisms and synchronous and asynchronous communication offering the benefit of being able to work very close to the problem at hand. At the moment, several systems (open-source and commercial) providing that functionality exist. Additionally, there are modules which can be used to glue together an integrated system and enhance existing systems.
In this work package, a platform serving the needs of the project and supporting the other work packages - especially WP4 - is created., As there are different levels of stakeholders, that have to be served in this project (technical, non-technical, strategic, general public, political), the system should provide profiles and context awareness to provide the appropriate content to the respective audience. The work is led by KTBL with strong support from Wireless Info, as both partners have experience with internet platform creation and open source community management. It is however necessary for all the partners to provide the requirements in the setup phase and feedback during the operational phase to be able to enhance the system further.

Task 3.1 Analysis of criteria to develop the platform (M1-M3):
Information is collected and user demands are analyzed in desk research to be able to formulate platform requirements. Other initiatives in the area of standards development already make use of similar tools as the one to set up. First step is thus to examine user communities and toolsets used by them in order to learn from their experience. (e.g. OASIS, OGC, SEMIC.EU, C@R, FOSS, etc.)
To achieve maximum usefulness of the platform, it is vital to define and describe the target groups. Different personas are characterized and their anticipated usage patterns outlined. As a preparation for the demonstration and feedback cycle planned in task 3.2, a list of possible functionalities and detailed descriptions of the purpose and possible ways of implementing them is created. Currently proposed content for this list includes items like: document management, version control, feedback tools (tickets, reporting, comments), interactive, collaborative modeling, synchronous communication (chat, tele-conferencing, video, whiteboard), asynchronous communication (forums, mailing lists).

Task 3.2 Create a website 'agriXchange.org' with appropriate functions (M1-M30):
Existing tools and platforms are demonstrated to the agriXchange community. Based on the requirements analysis from task 3.1, a very rough first prototype is developed demonstrating ideas of what could be done. Feed back from project partners is evaluated and the system modified accordingly. The platform requires constant maintenance throughout the project (e. g. create new user accounts, restructure documents according to new requirements etc.).

Task 3.3 Building contents and community (M4-M30):
Under coordination of WP6, stakeholders will be involved in providing content for the platform. As ICT developers can benefit the most of such a platform, they will be the main target group for acquiring. Based on the results from WP2, stakeholders in the different countries can be specifically addressed. During the course of the project, different interest groups will form. Measures will be taken, to support their specific demands. Reports from other work packages are managed and published using the platform. In collaboration with WP1 and WP6, marketing and publicity measures are planned and conducted. The platform will host the framework developed in WP4. While working on the use cases of WP4, new demands and requirements will arise, which have to be addressed by creating specific facilities. During project workshops, progress of the platform is communicated and further adjustments are planned.

Task 3.4 Feasibility study on self-supporting continuation of the platform (M14-20):
An important task is to ensure continuous evolution of the work done beyond the timeframe of the project. This involves developing strategies for long-term sustainability of the created platform. Desk research and analysis of working methods of existing communities provides a first overview. A consultation with the advisory committee provides further information. Licensing and privacy issues and financial support models have to be ruled out and decisions have to be made as to how to proceed with the platform.

Role of participants:

KTBL: coordination, analysis, development and study
WRLS: analysis**,** development and study
ASG-WUR: analysis and review
other partners: reviewing

Deliverables:

D3.1 report of criteria analysis (M3)

D3.2 website + specific tools (M6)

D3.3 community of practice (#people, #meetings, discussions) (M30)

D3.4 report on business model for long-term sustainability (M20)

WP 4				**Start date or starting event:**		M2-34				
Title:	Development of a reference framework for interoperability									
Activity Type:	Support Activities (SUPP)									
Participant number :	1	2	3	4	5	6	7	8	9	10
Participant short name	LEI-WUR	ASG-WUR	KTBL	MTT	WRLS	ELEV	IRTA	TEAG	ROST	FIBL
Person-months per participant:	7	0.5	4	8	2	5	0.5	0.5	1	0.5
Participant number:	11	12	13	14						
Participant short name	ALTA	PULS	ACTA Info	PROG						
Person-months per participant:	0.5	0.5	0	1						

Objectives:

O 4.1 To develop a reference framework to guide and support work for harmonizing data exchange in order to achieve interoperability between different systems in agricultural value chains.

O 4.2 Identify typical systems which data transfer can be unified in Europe with common agreement within a reasonable timespan

O 4.3 Develop criteria/recommendations for standardizing interfaces of agricultural systems

O 4.4 Identifying main content of a common vocabulary for agricultural systems

Description of work:

Due to complexity of agricultural systems, the harmonizing work will proceed gradually, focusing some well framed problems at a time. In this work package (WP4) the methodology to guide work for data exchange harmonization to achieve interoperability between different systems in agricultural value chains is developed. It will largely be based on the method that was described in section B.1.1.4. WP4 deals with the following questions concerning data exchange harmonization:

- How to identify problems?
- How to start problem solving?
- How to find/determine all the parties that should be involved in problem solving?
- How the actual work proceeds?
- How the solutions are proved?

The work package is divided into the fowling tasks:

Task 4.1 Elaboration of the methodology for framework development (M2 – M6)

This activity aims at the further specification of the methodology to use for development of the reference framework. It concerns the elaboration of the internal methodology and work plan as well as the further specification of the cooperation with other work packages and stakeholders. This activity will specify the methods for establishing the basic design, the generic integrative framework including a conceptual technical architecture, a generic reference information model, a technical communication infrastructure, and the institutional embedding, as well as the Living Lab for the harmonizing work. The specifications include the requirements for supporting activities like use-case documentation and the analysis activities in such a way that the required feedback for framework development can be delivered.

Task 4.2 Analysis of selected use-cases for identification and mapping of business process chains/networks (M4 – M14)

The basis for this activity will be the structure of the agricultural sector as defined in section B.1.1.1 and the mapping of the use-cases upon the agro food sector and its relations, using the methodology as developed in task 4.1.

It will take into account the different dimensions in the sector:

- different actors within the different chains: e.g. farmer, administration, production delivery
- relationships between actors
- actor processes
- data collections and their locations, which are specific to different actors and processes

Moreover, relevant information technology structures (techniques, standards, services) now and in the future and especially the aspects concerning information exchange are taken into account.

The selected use-cases are:

- **Updating of LPIS (Land Parcel Identification System)**, where a farmer collects data spatial data of her/his new field parcel boundary lines. The farmer sends data to LPIS service provider for updating the parcel boundary lines in the national LPIS. The national LPIS provider does the update to the system and prepares the further data delivery between different LPIS and

parcel information utilizing agricultural service or software application, taking into account the criteria of INSPIRE. Special attention is paid to the quality representation and assurance of exchanged data; proven data acquisition and data handling processes, content of metadata.

- **Geo-farmer and fertilizing**, where a German farmer, who uses a Czech farm management system, requests a site specific fertilizer advice, for a specific field. Field parcel boundary information is retrieved from the national LPIS. The advice service is based on a French knowledge-based advice module and it uses satellite data (LAI map) from a Dutch service provider, soil analysis data from the local soil laboratory and "FutureFarm" compliance to standards check functionalities to produce a to standards compliant fertilizer map in ISO 11783 format for the task file needed in fertilizer application. The executed fertilizer application is documented to the farm management information system, where the information is transferred to government's database in connection of administrative reporting.
- **Animal registration,** where an animal is transported from a farm in one EU country to another for growing, and to a third country for slaughter. In connection to every movement the animal registers are updated in both delivering and receiving countries.

A more detailed description of these use cases can be found in annex II

Task 4.3 Development of the reference framework (M8 – M20)
Using the methodology developed in task 4.1 and outcome of task 4.2, the reference framework is developed.
Analysis of the outcome of the task 4.2, including the cross-examination between the use-cases, are carried out. Since the three use-cases selected for the development and testing of the reference framework are selected to cover a large part of the whole agricultural sector as far as information exchange is concerned, it is expected that integration of the individual use-cases into the framework will lead to a fairly complete picture of the agricultural sector. On this base the first version of the basic design is formed.
The next step in the framework development, will be further specification of the generic integration framework. Using among others the outcome of the EU analysis (WP2) and the feedback that is provided by participating stakeholders (WP6), the gaps in the model not yet covered by the mapping of the three use cases will be filled out. Common features and generic building parts of the model as well as generic gaps will be identified and classified, leading to a list of used technologies (techniques, standards, services, etc.) and best practices are available for data exchange problem solving in further use cases taken under work in agriXchange community.
In order the stakeholders to be able to use the framework methodology, it is documented and a practice guideline for using this generic process model in solving data exchange problems in the agricultural community is produced.

Task 4.4 Verification of the viability of the reference framework as a supportive tool (M20 - M24)
The reference framework will be used as a tool to specify and target the problems for the further work of the agriXchange community platform. The problems identified in the use-cases are pointed out, and suggestions for the further work within the platform are presented. Verification of the developed framework is indispensible in order to prove the viability of the reference framework as a supportive tool for data exchange harmonization. A new use-case, animal identification, is selected to test whether the developed reference framework methodology works as an effective tool for harmonization the data exchange between its processes.
In the use-case **Animal identification**, the efficiency of the meat production is improved by using animal-specific production information collected from farm process devices, equipment and systems (like feeding, water consumption, air conditioning, animal scale) and slaughter houses (carcass scales and scanners). The information is also used for tracing the market brand information of the meat. The status of the slaughtered animal is updated in the animal register database based on identification information received from the slaughter house.

Task 4.5 Harmonising data exchange in the selected use-cases (M8-M34)
This task begins the actual data exchange harmonizing work of the AgriXchange community. Understanding motives and needs on the background of the present information systems in agriculture is important in order to harmonise data transfer between the systems. It is essential to distinguish factors behind chosen technologies being so unconditional that changing technology is not justified, not at least within a short time span, from those factors that are not so technology specific that used technology can be changed to another without causing losses to the system functionalities. In addition, to present existing information systems, also the possible systems in the future are taken into account. The task collaborates intensively with the WP3, especially its task 3.3 "Building contents and community" and with the stakeholders. Task 4.5 takes the results of the other WP4 tasks to the discussions and further development work in the community platform and workshops. The task 4.5 develops and utilizes Living Lab approach for implementing the practical pilots to support development of the generic reference framework and to enhance the harmonization in the practical level in Europe. The harmonizing work of the selected use-cases is in the main focus, and the main problem points, concerning e.g. business process interfaces of the systems, data formats and schema, vocabularies, quality assurance needed in the data exchange, are identified.

Role of participants:

MTT: Coordination of the work in WP4, elaboration of the methodology, contribution to use-cases LPIS and Geo-farmer; processes and functionalities, analyzing and modeling work, implementing Living Lab actions, interaction with WP3 for establishing harmonizing work
LEI-WUR: Elaboration of the methodology, contribution to use-cases LPIS and Geo-farmer; processes, functionalities and standards, analyzing and modeling work, implementing Living Lab actions
ELEV: Contribution to use-cases animal registration and identification; processes, functionalities and standards, and especially to verification of the reference framework with animal identification case, implementation of the Living Lab actions
KTBL: Elaboration of the methodology, contribution to all use-cases; processes, functionalities and standards, implementing Living Lab actions
WRLS: Contribution to use-cases implementing LPIS and Geo-farmer; standards and relation to INSPIRE and GMES, implementing Living Lab actions
ASG-WUR: Contribution to use-cases animal registration and identification; processes, functionalities and standards
PROG: Contribution to use-cases implementing LPIS and Geo-farmer
ROST: Contribution to use-cases implementing LPIS and Geo-farmer
Others: Commenting the results of the WP4 and participation in Living Lab actions.

Deliverables (brief description and month of delivery):

D 4.1 Detailed setup and work plan for the design and development of the reference framework, and requirements for the WP2 analysis considering data needs in WP4 (M3)

D 4.2 Criteria for use-case specification and documentation for data exchange harmonization (M6)

D 4.3 The first version of the basic design (M16)

D 4.4 Information models of the three selected use-cases (M20)

D 4.5 Report describing the reference framework; design and verification (M24)

D 4.6 Guideline for use of the reference framework as a supportive tool in data exchange harmonization work for interoperability (M30)

D 4.7 End report of the during the AgriXchange project achieved results in data exchange harmonizing work (M34)

WP 5				**Start date or starting event:**	M24-36				
Title:	Synthesis, recommendations and defining of the SRA								
Activity Type:	Support Activities (SUPP)								
Participant number :	1	2	3	4	5	6	7	8	9	10
Participant short name	LEI-WUR	ASG-WUR	KTBL	MTT	WRLS	ELEV	IRTA	TEAG	ROST	FIBL
Person-months per participant:	2	1	1	1	6	1	0.5	0.5	0.5	0.5
Participant number:	11	12	13	14						
Participant short name	ALTA	PULS	ACTA Info	PROG						
Person-months per participant:	0.5	0.5	0	0.5						

Objectives:

O5.1 To provide a Strategic Research Agenda which reflects the business demands for exchange of agriculture information supported by current standardization effort for agri-food industry

O5.2 Reflect the needs of the agriculture business and its current and future standards and regulations from the perspective of the future agriculture production

O5.3 Show future agri-food standard needs in comparison with potentially available ICT technologies

Description of work:

The SRA will identify the major challenges, related to the utilization of standards identified in agriculture and agri-food industry sector. The agenda will define Research and Technology Development areas which will be selected as key priorities in order to achieve the challenges identified.

The wide deployment and utilization of standards, which will be specifically oriented to the agri-food industry, will support the transformation of agriculture production into competitive and dynamic knowledge-based economy, as well as facilitating the participation and ultimately the complete integration of the EU agriculture production into the Knowledge Society. The SRA will be mainly focused upon KBBE and ICT within the FP7, but will also set of activities on regional and cross.-regional level as well as within other EU programs and initiatives. Having all of the main industry players involved is critical. Achieving the ambitious goals will require an equal commitment from industry, governments, agencies, operators, and agri-food authorities and stakeholders involved in rural development in all Member States. The SRA document will be prepared in two phases. First, it will present draft strategic lines that, after validation stage, will support all domain stakeholders in the process of implementing a number of specific measures to achieve stated objectives. Secondly, the final SRA will be prepared.

Task 5.1 Preparing draft of strategic research agenda (M24-M30)

A first draft of a “roadmap” will be developed that holds a set of common lines and objectives which are accepted by a number of regional and/or national RTD policy makers

Task 5.2 Validation of SRA by stakeholders (M30-34)

All project partners, policy makers, industrial key players as well as software & systems experts, specialized in the field of agri-food systems and, will validate the draft proposal for a common basis and draft roadmap. The project partners will be asked to review the draft SRA before the 3rd workshop. A broader review takes place during this workshop in conjunction with a meeting with the advisory committee

Task 5.3 Final SRA (M34-36)

The focus will be the identification of common RTD Research Agenda that can be accepted by a number of participating regions and countries for the implementation of desired status in the sector

Role of participants:

WRLS: coordination, preparing SRA
LEI-WUR, ASG-WUR, MTT, KTBL, ELEV: preparing SRA
other partners: reviewing

Deliverables:

D5.1 Draft of SRA 'Common Basis for policy making for introduction of innovative approaches on data exchange in agri-food industry' (M30)

D5.2 Final SRA 'Common Basis for policy making for introduction of innovative approaches on data exchange in agri-food industry' (M36)

WP 6				**Start date or starting event:**						
Title:	Stakeholder integration and dissemination									
Activity Type:	Support Activities (SUPP)									
Participant number :	1	2	3	4	5	6	7	8	9	10
Participant short name	LEI-WUR	ASG-WUR	KTBL	MTT	WRLS	ELEV	IRTA	TEAG	ROST	FIBL
Person-months per participant:	2	1	1	1	1	1	0.5	0.5	0.5	0.5
Participant number:	11	12	13	14						
Participant short name	ALTA	PULS	ACTA Info	PROG						
Person-months per participant:	0.5	0.5	5.25	0.5						

Objectives:

This work package is crucial for coordinating stakeholder involvement and obtaining broad support from the user's community. Hence the following objectives are defined:

O 6.1 Facilitating WP2-WP5 in involving relevant stakeholders at the European level in their activities

O 6.2 Ensuring involvement and support of relevant stakeholders at the European level in workshops

O 6.3 Dissemination of the project results at the European and national level

O 6.4 Putting the theme of information exchange on the agenda of other projects and initiatives at the European level

Description of work:

The tasks in this WP are done in close cooperation with the other WPs and in this way functions as a kind of integrator. A series of workshops, where the work and all relevant stakeholders come together, forms and important basis. Existing networks (e.g. EFITA) and contacts of all consortium partners are used for as well receiving input as dissemination of the project results. An advisory committee is set-up for getting explicit advise on project plans and strengthening ties for future support.

Task 6.1 Set-up of contact lists of relevant stakeholders for other WP-tasks (M1-3)

By using existing networks (e.g. EFITA) lists of relevant persons and organizations are provided that are needed for the in-depth analysis of the EU in WP2, community building in WP3 and WP4 and setting up the SRA in WP5. Through the activities in these work packages, the list will also be constantly enriched. There will be a special focus on the targeted end user group, i.e. tool developers (hard- and software).

Task 6.2 Organizing project workshops

A series of workshops are organized that are used to present and discuss the (draft) results and planned activities of the various work packages. The list of contacts from task 6.1 will be used for invitations, but by external communication (task 6.4) a wider audience is aimed at. For reasons of efficiency, but also to create a higher impact, cooperation with other events (e.g.. Futurefarm, Manufuture, EFITA, etc.) will be aimed at.

Three workshops will be organized:

1. Presentation and discussion of plans and first results of WP2, 3 and 4 (M12)
2. Presentation and discussion of results and follow-up activities of WP2, 3 and 4 (M20)
3. Large, final workshop with all stakeholders, presenting the results from all WPs and especially focus on draft SRA from WP5 (M30)

It is intended to organize the workshops in countries that are not directly participating in agriXchange or that need more support (derived from the results of WP2) in order to increase the impact to other countries. The workshops will be carefully prepared during the project meetings with all partners in advance.

Task 6.3 Set-up advisory committee and organize meetings with them

In negotiation with the European Commission, an advisory committee is setup. This committee consists of be persons from relevant stakeholder groups or organizations as described in section B.2.1.1.

Two meetings will be organized:

1. in conjunction with the second project meeting to get advise and comments on the plans
2. in conjunction with the third and final workshop to get comments on the results, input for finalizing the SRA and discuss ideas

for follow-up activities

Task 6.4 Disseminate the results by external communication (M1-30)
In addition to implicit dissemination of the results in the other tasks of this and other work packages, explicit dissemination will take place by:

- announcements and publications through the own platform (set-up in WP3), the EFITA newsletter and website and affiliated organizations (INFITA, IAALD, FAO, CIGR, etc.)
- publish/present results at other events (e.g. EU-ICT, EFITA, etc)
- maintain contacts with on-going projects or upcoming initiatives (e.g. FutureFarm, Manufuture, ICT-agri ERANET)

Role of participants:

ACTA Info:: coordination, supply contact network, organizing workshops and advisory committee, disseminate results
LEI-WUR: intensive dissemination (as project coordinator), contact with advisory committee, contribution to workshops
ASG-WUR, WRLS, MTT, KTBL, ELEV: contribution to workshops, contact with advisory committee and dissemination
other partners: contribution to workshops and dissemination

Deliverables:

D6.1 List of contacts in all countries to be used for WP2 - WP5 (M3)
D6.2 report from workshop 1 (M14)
D6.3 report from workshop 2 (M22)
D6.4 report from workshop 3 (M32)
D6.5 minutes from advisory committee meeting 1 (M8)
D6.6 minutes from advisory committee meeting 2 (M32)
Besides, there will be various ad-hoc publications, presentations and announcements at several moments

B.1.2.6 Efforts for the full duration of the project

Project effort form 1 - indicative efforts per beneficiary per WP

Project number (acronym) : 244957 (AgriXchange)

Participant No/ short name	WP1	WP2	WP3	WP4	WP5	WP6	Total per Beneficiary
1 LEI-WUR	10	0.5	0.5	7	2	2	**22**
2 ASG-WUR	0	5	1	0.5	1	1	**8.5**
3 KTBL	0	2.5	8	4	1	1	**16.5**
4 MTT	0	2.5	0.5	8	1	1	**13**
5 WRLS	0	2.5	6.5	2	6	1	**18**
6 ELEV	0	2.5	0.5	5	1	1	**10**
7 IRTA	0	1	0.5	0.5	0.5	0.5	**3**
8 TEAG	0	1	0.5	0.5	0.5	0.5	**3**
9 ROST	0	0.5	0.5	1	0.5	0.5	**3**
10 FIBL	0	1	0.5	0.5	0.5	0.5	**3**
11 ALTA	0	2.5	0.5	0.5	0.5	0.5	**4.5**
12 PULS	0	1	0.5	0.5	0.5	0.5	**3**
13 ACTA Info	0	0	0	0	0	5.25	**5.25**
14 PROG	0	1	0.5	1	0.5	0.5	**3.5**
Total	**10**	**23.5**	**20.5**	**31**	**15.5**	**15.75**	**116.25**

Project effort form 2 - indicative efforts per activity per beneficiary
Project number (acronym) : 244957 (AgriXchange)

Activity Type	Beneficiary 1 LEI-WUR	Beneficiary 2 ASG-WUR	Beneficiary 3 KTBL	Beneficiary 4 MTT	Beneficiary 5 WRLS	Beneficiary 6 ELEV	Beneficiary 7 IRTA	Beneficiary 8 TEAG	Beneficiary 9 ROST	Beneficiary 10 FIBL	Beneficiary 11 ALTA	Beneficiary 12 PULS	Beneficiary 13 ACTA info	Beneficiary 14 PROG	TOTAL ACTIVITIES
Consortium Management activities															
WP 1 Project coordination and management	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Total 'management	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Support activities															
WP2 Analysis of the current situation in EU-27 and Switzerland	0.5	5	2.5	2.5	2.5	2.5	1	1	0.5	1	2.5	1	0	1	23.5
WP3 Setu-up of agriXchange platform	0.5	1	8	0.5	6.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0.5	20.5
WP4 Development of a reference framework for interoperability	7	0.5	4	8	2	5	0.5	0.5	1	0.5	0.5	0.5	0	1	31
WP5 Synthesis, recommendations and defining of SRA	2	1	1	1	6	1	0.5	0.5	0.5	0.5	0.5	0.5	0	0.5	15.5
WP6 Stakeholder integration and dissemination	2	1	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	5.25	0.5	15.75
Total 'support'	12	8.5	16.5	13	18	10	3	3	3	3	4.5	3	5.25	3.5	106.25
TOTAL BENEFICIARIES	22	8.5	16.5	13	18	10	3	3	3	3	4.5	3	5.25	3.5	116.25

B.1.2.7 List of milestones and planning of reviews

List of milestones:

Milestone no.	Milestone Name	WP(s) no's.	lead beneficiary	Delivery date from Annex I	Comments
MS1	detailed project work plan	all	LEI-WUR	M2	validation by project participants
MS2	methodology for inquiry in EU countries	WP2	ASG-WUR	M7	validation by project partners, advisory committee and tested in 3 countries
MS3	prototypes of website and basic design of framework	WP3, WP4	KTBL, MTT	M7	validation by project participants and advisory committee
MS4	description of current situation in EU	WP2, WP6	ASG-WUR	M14	validation by country contacts and workshop participants and feedback through platform
MS5	full platform functionality as community of practice demonstrated by use cases	WP3, WP4, WP6	KTBL	M20	validation by workshop participants and feedback through platform
MS6	mature reference framework	WP4	MTT	M24	test by using a new use case validation by user group
MS7	full platform and framework functionality as network for developing systems for common data exchange in EU agri-food sector	WP3, WP4, WP6	KTBL, MTT	M30	validation by workshop participants, advisory committee and feedback through platform
MS8	strategic research agenda, embedding the network in a long-term development	WP5	WRLS	M36	validation by workshop participants, advisory committee and feedback through platform

Tentative schedule of project reviews:

Review no.	Tentative timing, i.e. after month X = end of a reporting period	*planned venue of review*	*Comments , if any*
1	After project month: 15	Helsinki	This is 3 months after the first workshop and MS4 has been reached one month before (M14). At this time (M15) there will be a project meeting in Helsinki
2	After project month: 30	Brussels	This coincides with MS7 and a large workshop that will be held in Brussels
3	After project month: 36	Brussels	

B.2 Implementation

B.2.1 Management structure and procedures

B.2.1.1 Project organization

The project management will ensure the development of the project according to the work-plan and will control the quality of outputs and dissemination of results. It will take care of the effective use of project funding. Because of the project structure and the extensive involvement of stakeholders and external experts, a strong project co-ordination is of crucial importance for the smooth implementation of the project.
The organizational structure is schematically presented in Fig. 11.

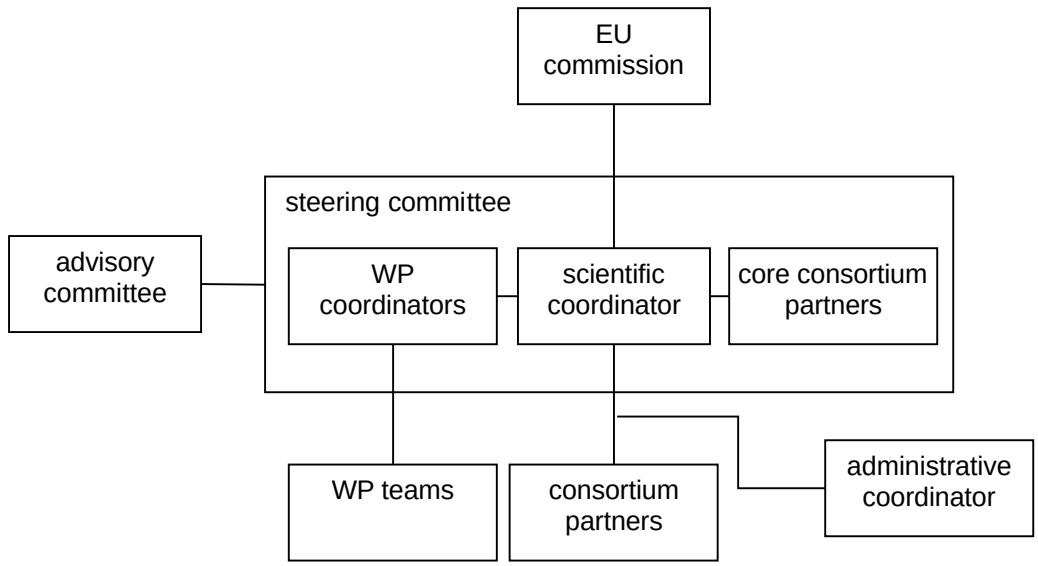

Fig. 11 Organisational structure of the agriXchange project

The different organizational units and their interdependencies will be described in the following subsections.

Overall Project Coordination
The project will be coordinated by LEI-WUR, the Agricultural Economics Research Institute, which has extensive experience in the coordination of large multidisciplinary EU projects in the previous framework programs. In contrast to research projects, the role of the coordinator is primarily to moderate the process, organize seminars, meetings and conference, synthesize module results, and undertake reporting and dissemination.
The tasks of the coordination (LEI-WUR) will be shared between a scientific co-ordinator, Dr. Sjaak Wolfert, and an administrative coordinator, Mrs. Monique Buijtendorp.

The scientific coordinator is the central contact person. He is officially responsible for the project towards the EU commission. He communicates with all project partners concerning general project matters, supported by the administrative coordinator. He communicates with

the work package coordinators concerning the progress of the work packages. He is chairing the steering committee. He will be responsible for:

- the scientific planning and progress monitoring of the project;
- safeguarding the quality and coherence of research activities;
- facilitating the communication between project partners on scientific and methodological issues; and
- the preparation and the timely delivery of scientific reports.

The administrative coordinator will be responsible for:

- the communication with partners and the Commission on administrative matters;
- the planning and preparation of project meetings;
- the minutes of the meetings
- the collection and timely delivery of the financial report (including externally audited cost certificates);
- and distribution of financial resources to project partners.

Steering committee

The Steering Committee will comprise all senior scientists/team leaders in the project core consortium and WP leaders, which are LEI-WUR, ASG-WUR, KTBL, MTT, WRLS, and ACTA Info. The committee will be responsible for supervision and controlling of all relevant aspects of the project, especially the information flow between the different work packages, the financial aspects and the co-ordination of the workshops. Meetings of the steering group will take place in conjunction with the project general meetings. Tele-conferences will be used when necessary.

A representative from the EU Commission/DG research, will be invited to the meetings of the steering committee to ensure a good coordination of the activities in the project with the work of the commission.

Work package coordinators

The Work package Coordinators, will manage the progress and communication within the work packages as well as knowledge transfer and communication between them. They are responsible for the coherence of the WP activities and the comparability and applicability of outputs. Assisted by the project coordinator, the work package coordinators implement the specified work plan and take care of the work progress. In case of necessary amendments of the work plan due to unforeseen problems, the work package coordinators will elaborate suggestions for alternative solutions in accordance with the scientific coordinator and the commission.

Consortium partners

The Partners organize the project progress within their organizations. In each participating country a co-coordinator will be responsible for the activities carried out by the country research team as well as the administrative implications related: the participation to project committee meetings, selection and contracting of sub-contractors, presentation of reports to the scientific and administrative coordinator at specified dates. Dissemination and further development of results in the country where research has been carried out will also be part of the partner's task.

Advisory Committee
In this project it is of high strategic importance to include relevant decision makers and other actors at European and national level in an Advisory Committee. This committee will be consulted two times at crucial stages of the project (see B.1.1.2). The first meeting is in month 7, after the project plan is elaborated in more detail by the project partners. The second meeting is at towards the end of the project when the strategic research agenda has to be finalized. In between a bilateral consultation is planned. The contact maintained with the Advisory Committee forms an important element of the dissemination strategy. Their interest and participation in the project will ensure that it is relevant, focused on real problems and has substantial impact.
The advisory committee should have ca. 10-15 participants. The final selection of members will be done in negotiation with the Commission in advance of the project. Members of the Advisory Committee should include:

- Farmer's organizations (COPA COGECA)
- Government (e.g. INSPIRE)
- Standardization bodies (e.g. ISOBUS, UN/CEFTACT, GS1)
- EDI/XML associations (Agro EDI Europa, EAV, AgroXML
- organization from the UK (e.g. ADAS, IAgSa, AIDC, Farmade)
- relevant ETP's like the Agricultural Engineering and Technologies (AET)working group from the Manufuture platform
- Food Industry
- Veterinarians
- Farm Machinery Industry
- Mapshots from US
- JRC
- FAO

B.2.1.2 Project meetings

Project meetings involve representatives from all project partners, irrespective of their involvement in managing a work package. Table 2 provides details of each meeting, the partner responsible for chairing the meeting, and the key decisions to be taken. (See also the Gantt chart in Fig. 10 for time-relationships with the WP-subtasks and other meetings.)

Table 2 Meeting schedule for project meetings and key topics and decisions

nr.	Date	Responsible partner/place	Key topics/decisions
1	M1	LEI-WUR, The Netherlands	- review Technical Annex and discuss internal milestones; - finalize responsibilities for work packages and reporting arrangements - decide on subcontracting guidelines and contracting arrangements. - detailed planning of tasks in WP2, WP3, WP4 and WP6
2	M7	KTBL, Germany	- discussing first test results of task 2.2 and decide on how to continue the analysis of the remainder of EU countries - discuss the prototype of the platform/website of WP3 - discuss the basic design of the integrative framework of WP4 - detailed planning of next tasks in WP2, WP3 and WP4 - preparation of the 1st workshop (WP6)
3	M15	MTT Finland	- review 1st workshop - process stakeholder feedback into project plan - discuss results from EU analysis - discuss first results from use cases in the framework (WP4) in conjunction with the platform function (WP3) - detailed planning of next tasks in WP3 and WP4 - preparation of the 2nd workshop (WP6)
4	M23	WRLS, Czech Republic	- review 2nd workshop - process stakeholder feedback into project plan - discuss results from use cases in the framework (WP4) in conjunction with the platform function (WP3)

			- detailed planning of next tasks, mainly in WP4 en WP5 - preparation of the 3rd workshop (WP6)
5	M30	LEI-WUR Brussels	(in conjunction with the 3rd workshop) - discuss final results of WP3 and WP4 - discuss draft SRA of WP5 - final preparation of the 3rd workshop - planning of finalizing the project

In each project meeting, the detailed plans for activities in the coming period, arrangements for the co-ordination of activities between respective work packages and eventual adjustments to the initial planning for the work program will be tabled on the agenda and discussed. All reports of progress will be made against existing milestones and deliverables as indicated in Annex 1. If severe difficulties are encountered, a quality assessment will be initiated by the overall coordinator, in collaboration with the Steering Committee (work package coordinators) and (if required) with an external reviewer to redesign the approach. This will ensure that targets are met, and that the overall quality of the project output is not diminished. The milestones will be reviewed at each meeting. Chairpersons of sessions within project meetings will be rotated to, amongst other things, encourage the active participation of junior and female scientists.
In keeping with the partnership concept, decision making will be made where possible on a consensus basis in both the project groups. If consensus is not possible, the Steering Committee will apply majority decision-making. However where strong disagreements are significant the Project Coordinator will have to decide at the end.
The financial aspects are coordinated by the project administrative coordinator who will report an account of expenses and costs incurred in carrying out each phase of the project on the basis of the accounts provided by the principal contractors during and at the end of each reporting period.

B.2.1.3 Monitoring and reporting progress

Each partner, in co-ordination with the respective work package coordinator, will provide a progress report at the project general meetings. Prior to the meetings, each will also draw up a short statement of progress (3-4 pages). This includes steps taken to implement elements of work packages for which they are responsible, milestone targets achieved, difficulties encountered and suggestions for modification in order to meet targets. Based on the experience of previous projects, the project coordinator will liaise with work package coordinators on a regular basis (by e-mail/phone) to check progress against milestones. Minutes of project meetings will be produced within 4 weeks of the meeting. The project coordinator is responsible for ensuring that action points arising during the meetings are carried out before the next meeting takes place.
The annual report, based on these written and oral statements together with financial information, will summarize the overall status of the work program. The information will be available to participants through a limited access web site, allowing interaction outside the framework of project meetings. The coordinator will prepare scientific and financial project reports for the Commission following the rules and guidelines that will be provided.

B.2.2 Beneficiaries

Partner 1 Agricultural Economic Research Institute (LEI-WUR), Den Haag (NL)

Role in project:		
WP	*Contribution:*	*Responsible*
1	Project coordination and management	Wolfert
2	Review of the methodology and recommendations	Verdouw

3	Review of the results and contribute content to the platform	Wolfert
4	Development of the methodology Contribute to the use cases LPIS, Geo-farmer	Verdouw Verloop, Krause, Lokers
5	Development of the SRA	Wolfert
6	Co-organizing workshops and advisory committee	Wolfert

Expertise of organisation:
The Agricultural Economics Research Institute (LEI) is the leading institute in the Netherlands for social and economic research on agriculture, horticulture, fisheries, forestry and rural areas. The LEI's focus at both national and international level is the increasing integration of agriculture and agribusiness in the social environment. The institute has 300 employees with a wide range of expertise. The LEI forms part of Wageningen UR, a co-operative venture between the Agricultural Research Service, Wageningen University and Research in Practice, and is the central organisation for fundamental strategic and applied research. The LEI's services target the agricultural sector in its interaction with its critical environment. This involves services both for primary production in agriculture, horticulture and fisheries, and for supply and processing industries, trade, consumers and policymakers. The LEI aims to take a leading national and international role in the field of information services by gathering and analysing data and carrying out independent scientific research. The LEI plays an important advisory role for the Dutch Government.
At LEI, an open innovation environment is established, called Living Lab “Information Management in Agri-Food Supply Chain Networks”. It will be facilitated by existing information systems for simulation, innovation and experiments. These concern mainly Enterprise Application Integration (EAI) solutions, because of the focus on information integration topics. Currently, EAI software like Cordys, Oracle SOA Suite) is available for research and education purposes that can also be used in this project.

There will be two persons from Alterra detached, because they have specific complementary expertise for this project. Alterra belongs to the same umbrella organization ‘Wageningen UR’.

Alterra is the Dutch research institute for the green living environment. Alterra offers a combination of practical and scientific research in a multitude of disciplines related to the green world around us and the sustainable use of our living environment. Alterra plays an important advisory role for the Dutch Government in this area. Clients include the European Union, World Bank, universities, local, national and international governments, NGO’s and commercial companies. The Centre for Geo-Information of Alterra focuses on research regarding spatial problems and the innovative use of geo-information in areas like agriculture, water management, climate change and spatial planning. As such the centre has among others outstanding knowledge and experience in the use, standardization, integration and exchange of spatial information.

Scientific team (position, main roles and individual expertise):

Dr. Sjaak Wolfert studied Plant Science with a specialization in Crop Ecophysiology at Wageningen University. In 1996 he graduated *cum laude*. He wrote a dissertation on ‘Sustainable Agriculture: how to make it work? A modelling approach to support management of a mixed ecological farm’ and received a Ph.D. degree in 2002. Since 2001 he is working as a senior scientific researcher at the Plant Department of the Agricultural Economics Research Institute (LEI) in The Hague. His main research areas are systems analysis, modeling and simulation, management support systems & ICT and sustainable development. He was involved as researcher and coordinator in several large national, international and EU-funded projects. Till July 2009 he is president of the European Federation of ICT in Agriculture, Food and the Environment (EFITA); he is also president of its Dutch national member organization (VIAS).

Dr. Marco Verloop studied Applied Physics at Delft University of Technology. He received his PhD, at same university, on a dissertation on a physical and chemical theme, including numerical modeling. He worked several years in the ICT business, mainly on Enterprise Resource Planning (ERP) software. Since 2007 he is scientific researcher and ICT architect at the Plant Department of the Agricultural Economics Research Institute (LEI) of the Wageningen UR. His main research topics are Business Process Modeling (BPM) and Service Oriented Architecture (SOA), applied to Agri Food Supply Chain Networks (AFSCN). He is project leader of the Living Lab “Information Management in AFSCN”. He is involved as researcher in several national and international research & development projects.

Drs. Cor Verdouw holds an MSc degree in business economics at the Erasmus University Rotterdam. After graduation in 1998, he worked as an ICT consultant and project manager in ICT Management, Business Process Modelling and ERP-implementation in different industries. Since 2002, he is researcher at the Plant Systems Division of LEI-WUR in the field of supply chain management and information management. In 2005 he started a Ph.D. research on reference-information modeling in demand-driven agri-food supply chain networks at Wageningen University.

Ir. Rob Lokers (Alterra) holds a MSc degree in Agricultural Engineering with a specialization in information technology at Wageningen University. He worked in ICT business for 8 years, mainly focusing on the field of scientific applications, agro-logistics, and the use of Electronic Data Interchange (EDI) in agriculture. Since 2002 he works at the Centre for Geo-Information of Alterra-WUR as a researcher in the fields of geo-information and spatial modeling. His core areas of expertise are information modeling, system analysis and information exchange in areas like agriculture, soil and geology and cultural heritage. He is involved in several large national and international projects as IT-researcher and coordinator. He coordinates the EU-FP6 project FieldFact, that focuses on the promotion and use of GNSS (EGNOS, Galileo) and the integration of spatial data in agriculture.

Dr. Arno Krause (Alterra) is a researcher and project manager at Alterra-WUR, with 10 years of experience. He has a large and in-depth experience in the field of LPIS and LPIS-GIS as well as in GIS and GIS-application development and spatial data management with special focus on Cross-Compliance and applications for agriculture. He was mainly responsible as a project coordinator for the implementation and operationalization of the LPIS and IACS-GIS in various federal states of Germany and Romania, and works as consultant for the implementation and operationalization of the LPIS in Romania and Greece.

Partner 2 Animal Sciences Group (ASG-WUR), Lelystad (NL)

Role in project:		
WP	*Contribution:*	*Responsible*
1	Contribute to project meetings	Holster
2	Coordinating the WP, executing investigations and reporting. Responsible for focus-group Benelux and UK & Ireland.	Holster, Ipema
3	Testing, reflecting, contributing in functional demands	Holster
4	Development of the methodology Contribute or review to the use cases Animal registration, Geo-farmer	Holster,Goense
5	Review results of the SRA	Lokhorst
6	Co-organizing workshops	Holster

Expertise of organisation:

The Animal Sciences Group of Wageningen UR (ASG) is an internationally leading knowledge partner for animal production. Together with the national government and the animal production sectors in the Netherlands, ASG wants to create a basis for innovative developments that break new ground for the farming sector. For now, but most definitely also for future generations. The primary task of ASG is to develop and apply knowledge and expertise aimed at a profitable and sustainable animal production sector. In other words, opening new perspectives for the future!
Our broad spectrum of expertise means that ASG is the knowledge and business partner for a wide range of clients. We advise and support national and international governments, marketing boards, farmers organizations, knowledge and research institutes as well as the national and international business community on their business processes and complex problems. ASG owns seven experimental dairy farms, to guarantee practical application of new developments.
In this project the business unit animal husbandry will be involved. This unit has approximately 250 co-workers (approx. 200 scientific and technical personnel) and covers Animal Welfare & Behaviour, Animal Health, Housing& Environment, Farm Systems and Chain Management, Systems Innovations, Breeding& Genomics, Animal Nutrition, Grass and Forage Systems. Within the group of Farm Systems and Chain Management, (ICT) modeling and standardization on farmers and chain level are developed. The expertisegroup ICT management & chain systems has been involved in quite big standardization projects from the past century in the Netherlands. Over the last years ASG developed new knowledge in precision livestock farming and sensor technology.

Scientific team (position, main roles and individual expertise):

Ing. H. Holster is a researcher, project manager and network facilitator with almost 20 years experience in ICT in agriculture. Since about 10 years he has large experience in information management on farms and agricultural chains with a focus on information management and standardization in livestock farming. Besides standardization projects in pig husbandry and dairy he worked the past years as responsible project manager on ICT infrastructure and architecture projects on an national (governmental) scale. He was involved in precision (livestock) farming projects as well, like Geo-farmer. The past years he skilled himself as a professional in process and network facilitating, of groups of farmers and others, working on sustainable livestock farming.

Ir. Bert Ipema is a researcher and project manager with a large and international in depth experience on sensor technology, (automatic) milking technology and information and knowledge systems. He has been involved in several precision livestock farming projects for the past years. For example Lofar-agro and WASP. The Lofar-Agro program explores and develops sensor products and services in the precompetitive stage. An important feature is the application of *real-time, streaming* sensor networks for monitoring and optimizing plant and animal production. The EU-project WASP (Wirelessly Accessible Sensor Populations) - www.wasp-project.org - handles the provision of a complete system view for building large populations of collaborating objects. It incorporates networking protocols for wireless sensor nodes.

Dr. Ir. Daan Goense is a senior researcher with many years of international experience on Agricultural technology, mechanization, precision agriculture, sensor technology, programming and software-engineering. Concerning standardization he is chairman of NEN (Dutch standardization institute) convener of ISO/TC23 in common and chairman of working group 5 (wireless sensors). The past years he was project leader of one of the Lofar-agro projects where a sensor-based management on microclimate fighting the Phytophtora potato disease was developed.

Dr. Ir. Kees Lokhorst is senior researcher and leader of the precision livestock research- en development team of ASG. He is very experienced in agri-technology and food science, animal production systems, integrated production systems, information and knowledge systems with an organizational science background in poultry pig, dairy and arable farming management. He is general manager of the Joint International Agricultural Conference in 2009 where development of EFITA, precision agriculture and precision livestock farming come together.

Partner 3 Kuratorium für Technik und Bauwesen in der Landwirtschaft (KTBL), Darmstadt (DE)

Role in project:		
WP	*Contribution:*	*Responsible*
1	Contribute to project meetings	Kunisch
2	focus group coordinator, analysis and reviewing	Martini,

		Schmitz
3	Coordinator and main implementor of the platform	Martini, Schmitz
4	Expertise on methodologies on a technical level, contribution of models to all use cases Content provider	Kunisch
5	reviewing	Kunisch
6	contribute to workshops	Kunisch

Expertise of organisation:

The Association for Technology and Structures in Agriculture (KTBL) is a registered association in Germany. Among the 400 members are agriculturalists, business people, consultants, public administrators and scientists, who all share the goal of enabling the agricultural sector and rural zones to benefit from technological advances. The headquarters resides in Darmstadt, where staff of approx. 60 people supports various areas of activity. KTBL is promoted by the German Federal Ministry of Food, Agriculture and Consumer Protection. The activities are based on the government's agricultural and environmental policies and on the needs of our target groups. The KTBL's main objective is to promote environmentally friendly and society-embedded agriculture in accordance to the needs of consumers, particularly with regard to agricultural engineering techniques and methods in cultivation, species adapted livestock farming and landscape management. Growing importance is also attributed to the production of raw materials and energy and recycling of organic wastes.
The KTBL's mandate is knowledge transfer of scientific findings into agricultural practice. It provides a forum for scientists, consultants, administrators, agriculturalists and representatives of trade and industry to share and discuss experiences, ideas and information. With its activities, it supports policymakers and administrators in drafting legislation and helps to create regulations and legal instruments. Apart from printed publications containing planning and decision support data for farmers, consultants and administration, focus is increasingly leaning towards internet based information provision. The KTBL has implemented several tools offering calculations of economic data and providing informational services across the internet to clients. Personnel having experience and knowledge in programming database backed servlets is available at KTBL.
One of the focuses of the work is exchange and provision of data to enhance information management in agriculture. For this purpose, KTBL has initiated development of agroXML, an XML-based language for agricultural issues. The work is attended by a committee, consisting of representatives of the majority of agricultural software suppliers and other parties interested in data exchange and management in agriculture in Germany. Tools for collaborative development are used by the agroXML team and in the past a number of different methods and technologies for data modeling and format specification have already been evaluated.

Scientific team (position, main roles and individual expertise):

Dr. Martin Kunisch has done a PhD in plant protection in modelling of weed populations at the University of Hohenheim. He has conducted scientific work on weed population models in research projects in Benin and Nigeria. Before working at KTBL, he was a freelancer and consultant in technology transfer from science to industry. Since 1994, he is in leading function at KTBL. Currently, he is vice CEO, responsible for the data management department and initiator and project leader of agroXML.

Daniel Martini has studied agricultural sciences at the University of Hohenheim, Germany. He specialized on soil science. Apart from his knowledge in agriculture, he has a broad background in IT involving operating systems, geographic information systems, data bases and network and communication technologies. Currently, he is conducting the conceptual modelling and the technical development of agroXML at the KTBL.

Mario Schmitz has an education as mathematical-technical software developer at the Center for Computing and Communication of the University RWTH in Aachen, Germany. His special strengths are in object-oriented programming languages – especially Java –, software engineering and data exchange. Since 2006, he works at the KTBL Darmstadt. Main tasks, among others, are the technical development of agroXML and the implementation of corresponding software solutions.

Dr. Jürgen Frisch has studied agricultural sciences at the University of Hohenheim, Germany. He specialized on agricultural engineering and has done his PhD in the field of labour economics. In KTBL, he dealt with radiofrequency identification of animals and application development. Currently, he is responsible for the database and web application team and involved in the development of agroXML.

Partner 4 MTT Agrifood Research (MTT), Jokioinen (FI)

Role in project:

WP	*Contribution:*	*Responsible*
1	Contribute to project meetings	Pesonen
2	focus group coordinator, analysis and reviewing	Teye
3	Commenting on the development of the technical tools of the platform	Thessler
4	Coordinating the development of the reference framework for interoperability and organization of the harmonization work according to it	Pesonen
5	Development of the SRA	Pesonen
6	Co-organizing the workshops, contacts to FutureFarm and possible ICT-AGRI projects	Pesonen

Expertise of organisation:

MTT Agrifood Research Finland is an expert body operating under the Finnish Ministry of Agriculture and Forestry. We produce and disseminate scientific research information and develop and promote the transfer of new technology for the agriculture and food sector as a whole. MTT has over 800 employees, of which 40 % are researchers. MTT's Plant Production Research unit has 250 employees. Plant Production Research produces new knowledge and technology for sustainable and profitable plant production systems for agriculture and horticulture, including organic farming. An important aim is to improve the diversity of rural nature and landscape and to preserve plant genetic resources.
Apart from conventional cultivation plants, the unit develops actively new varieties and production technologies for horticulture and landscaping, as well as for new biomaterials and bioenergy.
An emerging research area in Plant Production Unit is the management and processing of data to support decision making and process control at operations level and farm management level with the help of modern ICT-tools and wireless solutions. These technologies are also applied to predict and control nutrient leaching and pest invasions. This part of the unit's research is carried out through the Environmental and Technology Programmes of the MTT.

MTT's involvement to EU projects at the moment: RIBESCO (AGRI GEN RES 071), WatNitMed (INCO-CT-2002-509107), ENVASSO (SSPE-CT-2005-022713), RESISTVIR (FOOD-CT-2005-006961), BIOEXPLOIT (FOOD-CT-2005-513959), FutureFarm (FP7-KBBE-CT-2008-212117), TriceaGenome (FP7-KBBE-CT-2008-212019), ENCROP (EIE/07/073/S12.467608). Participating the proposal in contract negotiation phase: ICT-AGRI (FP7-ERA-NET-2008-RTD)

Scientific team (position, main roles and individual expertise):

Markku Järvenpää is Lic.Sc. (Agr. Eng.) and director of Technology Research Programme in MTT. He has over ten yeas experience in Agricultural Engineering Research and over ten years experience in science administration in the European Commission (Dg Research, Life Sciences), Tekes, the Finnish Funding Agency for Technology and Innovation, and the Ministry of Agriculture and Forestry in Finland. Since 2007 he has lead the Technology Research Programme in MTT, which main focus is to develop future farm technologies to support the sustainability and profitability of agriculture.
Liisa Pesonen is a senior research scientist at MTT Plant Production Research unit in Crop Science and Technology research group. Main research area is precision farming, i.e. site-specific nitrogen fertilisation planning, site-specific data acquisition, GIS based cultivation management, environmental technology, machine automation in plant production and user-centric information management in farm. She has been working in the Nordic co-opration research projects "InfoXT - User-centric mobile information management in automated plant production" (2006-08, coordinator) and "NordUnet Agro – Mobile internet services for online support of agricultural machinery" (2006-2009). The key researcher participating in EU 7FP project "FutureFarm" from MTT.
Frederick Kwame Teye is a senior scientist at MTT Plant Production Research unit of the Crop Science and Technology research group. His recent research experience was with automated air quality measurement systems for dairy production facilities. In addition, he has been implementing real-time data transmission from different agricultural measurement systems using wireless communication, and also investigated the standardization of agricultural and forestry machines. The key researcher in EU 7FP project proposal "ICT-AGRI" from MTT.
Sirpa Thessler is a PhD (Geography) and principal research scientist in GIS services of MTT Service unit. Her research has focus in recent years in automatic monitoring of environment and sensor networks. She has coordinated the deployment and maintenance of "SoilWeather – technological platform for developing information services" (2007-2008). She also has experience in wide variety of GIS tasks in agricultural sectors and good experience in remote sensing of forests, in which she focused in her PhD thesis.

Partner 5 Wireless Info (WRLS), Praha (CZ)

Role in project:

WP	*Contribution:*	*Responsible*
1	Contribute to project meetings	Charvat
2	focus group coordinator, analysis and reviewing	Charvat
3	Sensor observation standardization and relation to INSPIRE and GMES	Horak
4	SRA development on the base of previous experiences from AMI@netfood	Charvat
5	Organisation of events n Czech and Latvia	Gnip
6	Responsibility for Central Europe and Baltic countries	Gnip

Expertise of organisation:

WIRELESSINFO is non-profitable Czech association - virtual research institute founded in 2003 by Czech participants on project WIRELESSINFO IST 1999- 21056. WRLS group a only Czech partners from different location and focus. WRLS has a very wide field of activities with a big exploitative research and implementation potential on both on Czech market and European market. Association group a follow partners:

Main goals of **WIRELESSINFO** association are to coordinate activities in research, new development, testing and exploitations of new information systems and technologies for data collection and data transport on the market, which are collective for all members. WRLS has a very wide field of activities with a big exploitative potential on both on Czech Agricultural market and European Agriculture market.

Research and development activities in area of

- § IST for agriculture and forestry
- § GIS and SDI
- § Web services
- § E collaboration
- § Mobile solution
- § E learning

WirelessInfo has large experience from past and running projects
WirelessInfo - objective was to implement advanced wireless communications into multimedia systems and services for rural applications.
Premathmod - The goal of the project was to improve methods for data access and statistical data analysis in precision farming.
The VOICE - Implementation of prototypes, i.e. the implementation of collaborative environments with representative applications and services for domain-
AMI4FOR - The main objective is to establish a new concept of Ambient Mobile Intelligence (AMI) for forest, vinary and agriculure management integrated mobile communication, new methods of navigation (GPS, EGNOS, GALILEO) and integration of spatial information including satellite imaging (SPOT, IKONOS, EROS, PROBA).
AMI@Netfood - The objective was to support the implementation of the IST Research Priority and Framework Programme, providing a long-term vision on future trends on Scientific and Technology Research oriented to the development and application of Ambient Intelligence technologies to the agri-food domain.
Navlog – Navigation and logistic systems
MILQ - QC – TOOL - The objective of this project is to develop predictive models as Web application on the Internet for optimisation of heat treatment in SMEs in the dairy industry.
Earthlook – Innovative solution for implementation of Global Monitoring for Environment and Security (GMES)
c@r - C@R aims to boost the introduction of Collaborative Working Environments (CWE) as key enablers catalyzing rural development. According to this strategic goal, the C@R Integrated
The FutureFarm Project challenges goal is integrating Farm Management Information Systems to support real-time management decisions and compliance to standards".

The WirelessInfo will offer in project expertise in are of sensor deployment, communication between sensors and Web environment and also implementation of Sensor Web Enablement service. Due its previous experience with commercial implementation of Prefarm system, it will also cooperate on integration of solution

Scientific team (position, main roles and individual expertise):

Pavel Gnip is the main manager of the Precision Farming division and Chairman of the WIRELESSINFO association. His key qualification is Management of Precision Farming. He has seven years experience with precision farming database and data processing, GPS and DGPS equipment, specialist for mapping, soil sampling, variable applications, software for precision farming, five years experience with satellite imaginary, five years experience with yield mapping, agronomical advisory, wireless data transport in precision farming systems. He participated in projects as an expert for agriculture focused on Precision Farming management (WirelessInfo IST 1999-21056, Premathmod IST-2000-28177).

Karel Charvat graduated in theoretical cybernetics. His key qualifications include web services, digital photogrammetry, remote sensing, information technology, GIS, environment, forestry, regional development, and agrotourism. He was president of EFITA (2005-2007). He was a project manager in different projects: WirelessInfo IST 1999-21056, Premathmod IST-2000-28177, Naturnet and was involved in EMIRES, REGEO, Rural Wins, Armonia, a Bard, EPRI Start, Ami@netfood, AMI4For, Voice, Naturnet Redime, Mobildat, SpravaDat, Navlog.

Petr Horak is a forest engineer. He participated in international projects (1) NATURNET-REDIME - New Education and Decision Support Model for Active Behaviour in Sustainable Development Based on Innovative Web Services and Qualitative Reasoning (2) AMI4FOR - New model for knowledge management in forestry based on integration of principles of ambient mobile intelligence, new methods of navigation and integration of space imaging, and (3) MILQ-QC-TOOL. The development of predictive models on the Internet for optimisation of heat treatment of raw milk in small and medium-sized dairy companies.

Martin Vlk participated in international projects (1) NATURNET-REDIME - New Education and Decision Support Model for Active Behaviour in Sustainable Development Based on Innovative Web Services and Qualitative Reasoning (2) AMI4FOR - New model for knowledge management in forestry based on integration of principles of ambiente mobile intelligence, new methods of navigation and integration of space imaging, and (3) MILQ-QC-TOOL - The development of predictive models on the Internet for optimisation of heat treatment of raw milk in small and medium-sized dairy companies.

Matej Krocan studied Mathematics methods in Management on Comenius University, Faculty of Mathematics, Physics and

Informatics, Bratislava. During his studies he already cooperated on European research projects. His diplom thesis was Project Output's Marketing Mix Proposal, which was part of marketing analysis for project MILQ-QC-TOOL COOP-CT - 2005 - 018176. He also cooperated on Naturnet Redime project mainly in the area of communication with users.

Partner 6 Insitut de l'Elevage (ELEV), Paris (FR)

Role in project:		
WP	*Contribution:*	*Responsible*
1	Contribute to project meetings	Rehben
2	focus group coordinator, analysis and reviewing Needs, current situation for cattle and recommendations Needs, current situation for national animal identification data base and recommendations Needs, current situation for small ruminants and recommendations Needs, current situation and recommendations for on farm exchange with AMS, RFID identification…	Rehben Fusai Piednoir Astruc B Balvay
3	Contribute to the content	Oberti
4	Contribute to the methodology Contribute to the animal use case	Oberti Piednoir Oberti Balvay
5	Contribute to the content and the organisation ot the validation	Dos Rehben
6	Contact list and contribution to organisation of workshops	Oberti
Expertise of organisation:		

The French Livestock Institute is an applied research and transfer institute dealing with cattle, sheep, goats and horses. It is managed by the professional livestock federations. It is developing 3 main strategies:

- management of the breeding and genetic data for cattle, sheep and goats at the national level,
- production of references for or a sustainable livestock husbandry: economic optimization of the livestock farming systems and technical routes for quality products, respecting the environment, the animal welfare, and contributing to territorial management,
- lighting of the previous choices by the follow-up of the economic situation, the studies of production chains and the cooperation projects at the European and international levels.

Organization of the research institute
245 employees of whom 205 engineers and technicians spread over the 11 regional sites and headquarter in Paris.
The Institute is organized into 4 departments: genetics, regional actions, techniques and quality, economy.
Several tools gathering the partners of the extension services are used:

- experimental stations to experiment at the animal, herd or farming system scales,
- farm networks to make technical-economics references for each breeding system,
- networks of technical skills gathering advisers in the same field: buildings, milking techniques, farmhouse cheese production,
- lab specialized in meat technologies and their analysis.

The main financial resources come from:

- French Agricultural Minister via a special fund (taxes on milk and meat products, and a direct funding for identification and animal genetics),
- French Office for Meat and Dairy Products, the professional organizations (milk and meat) and calls for research project,
- sale of services (expertise, training, edition and diffusion…).

The annual budget is around 25 million Euros.

Research and competence fields
Economy: Impacts of the European politics and world market agreements on milk and meat chains and livestock farms economy
Genetics: Management of national programs: genetics, identification, performance recording, Management of the genetic resources for small endangered ruminant breeds
Livestock farming systems: Sustainable farming systems (working time, land management and breeding, quality management: registered denominations of origin, organic farming)…
Livestock husbandry techniques: Improvement of security in forage production systems towards hazards and climatic changes, Implementation of technical routes needing less energy, water, conception of low cost l buildings, management of the quality products (epidemiology and management of contamination risks by pathogens, improvement of the nutritional value of milk and meat products, management of the sensorial quality of meat, management of the micro-organisms ecosystems and the contamination risks by xenobiotics), assessment and management of animal welfare, management of the environmental risks (assessment and mitigation of the greenhouse gases, improvement of the management of mineral flows (N, P, K)), management of health in the herd and use of medicines.
Services and products
Edition: the French Livestock Institute publishes each year more than 500 documents, for free or for sale which are listed on the Internet website: http://www.inst-elevage.asso.fr/html1/index.php3 (weekly newsletter).
Training courses: Every year, about 50 training courses are organized by the French Livestock Institute (see catalog) for advisers and applied research workers in cattle, sheep and goats sectors, representing about 2 000 training days. Some training courses for foreign countries are organised according to the wishes.
Partnership and cooperation
At a national scale: The French Livestock Institute is related to INRA for some European projects (Welfare Quality…) of for ANR (Agriculture and Sustainable development, Gen-Animal…) and for larger common programs for 5 years “technical mix units”. Other projects are involving universities, veterinary institutes) or CEMAGREF (pastoralism, multifunctionality, pollutions management…)
At the European scale: In 2006, the French Livestock Institute is involved in 10 European R an D projects (6th FW, Inter-reg, PHARE…). As an example, the French Livestock Institute is the coordinator for the Green Dairy project (Inter-reg III B) whose aim is to implement a network of 9 experimental farms and 9 groups of pilot farms among 10 regions of the Atlantic Area dealing with nutrient pollution decrease in dairy farming systems. The French Livestock Institute also takes part to the “Welfare Quality” project, dealing with animal welfare and products quality. It is also involved in several networks like data bases of animal genetics, identification, performance recording…
At the international scale: The French Livestock Institute has set up a livestock international cooperation bureau, which values the know-how of the whole French livestock professional organizations thanks to several projects in Southern America, Northern Africa, Middle East, Russia and Southern-East Asia.

Scientific team (position, main roles and individual expertise):

J Erik Rehben holds a Master in Engineering in agronomy with livestock production as a special subject livestock production of National Institute of Agronomy Paris-Grignon (now part of AgroParisTech).and a degree in business administration. He has been working for two years in ICT business focused on industrial production monitoring. From 1983 to 1993, in ITEB has been in charge of the French on farm performance recording scheme for beef cattle. From 1993 until now at Institut de l’Elevage, project director of the common animal information system for breeding organizations, consultancy to French ministery of Agriculture for the national animal identification data base, from 1998 head of the information and traceability division and since 2007, deputy head of the department of genetics. He was involved from 1994 to 1998 in the ISO project on ADED/ADIS standards, from 2002 to 2004 vice president of the International Committee of Animal recording (ICAR) and took part as consultant into several international projects (implementation of animal identification in Mexico, twinning with Poland….)

Jean Michel Astruc holds a Master of Engineering in Science and Technics of livestock production of National Institute of Agronomy Paris-Grignon (now part of AgroParisTech). Since 1989, he has been project manager in charge of the information system on genetic data in dairy sheep production in France. He has also worked on the French dairy sheep breeding programs. He has in charge the coordination of the genetic information systems of all small ruminants in France. He is chairman of the working group on milk recording in sheep of ICAR (International Committee for Animal Recording)..

Béatrice Balvay holds a Master of Engineering in Science and Technics of livestock production of National Institute of Agronomy Paris-Grignon (now part of AgroParisTech). Since 1990, she has been project manager in charge of coordination of the computer system relative to cattle performances recording and filiations certification : the system has been totally rebuilt in the 90's and she participated to the conception of the new system. She's now in charge of administration. Since 2004, she has been managing the national experimentation of radio frequency identification for goats. Since 2007, she's member of ISO Group TC23/SC 19/WG3 (WORKING GROUP ELECTRONIC ANIMAL IDENTIFICATION).

Cécile Dos holds a Master of Engineering in Food Sciences of National Institute of Agronomy and Food Sciences of Nancy. She worked 6 years as Project Manager and Application designer in a software engineering company. Since 2004, she has been working as project manager in the French Livestock Institute. She was in charge of the administration of the Genetic Cattle Information System for 4 years. Since 2008, she's in charge of the coordination between the different Genetic Information Systems (cattle and small ruminants) and of the administration of the Genetic Goat Information System.

Bénédicte Fusai holds a Master of Engineering in agronomy with agri-food industry as special subject of Paris Institute of Technology for Life, Food and Environmental Sciences. She worked 3 years in the ICT business, mainly on a training software. Since October 1999, she has been a project manager in charge of project about implementation of IT systems for animal identification or performance recording. She has participated of the bovine genetic IT system renovation, more specially in the part concerning the morphology of dairy cows. She has been in charge of a project about implementing a quality management system for the organisms in charge of animal identification. She is a member of the non formal working group between Netherlands, Germany and France, dealing with data exchange in animal fields.

Jaqcues Obert holds a Master of Engineering in agronomy of National Institute of Agronomy Paris-Grignon (now part of AgroParisTech). He has been involved until 1992 at ITOVIC in different project of software for sheep and goat industry production. From 1993 at Institut de l'Elevage as project manager of several activities dealing with ICT and animal production. Since 2004 has been working on the new French system of electronic data interchange for agriculture designed according the enterprise architecture basics with contributions to the analysis of business processes, repository and XML message implementation.

Benoist Piednoir holds an Meng degree in agronomy of Paris Institute of Technology for Life, Food and Environmental Sciences. He worked 3 years in the ICT business, mainly on Enterprise Resource Planning (ERP) software. Since 1999, he contributes to the definition, building and running of the French national database for animal identification and registration, with a particular responsibility in the creation of the data exchange standard used in France for all legal registrations in identification and registration for cattle, sheep and goat. Since 2005, he's responsible for the coordination of animal tracability activity of the 12 person's team in the French Livestock Institute. He is a member of the non formal working group between Netherlands, Germany and France, dealing with data exchange in animal fields.

Partner 7 Institut de Recerca i Tecnologia Agroalimentaries (IRTA), Barcelona (ES)

Role in project:

WP	*Contribution:*	*Responsible*
1	Contribute to project meetings	Bach
2	active contribution to analysis for own country, reviewing	Bach
3	reviewing	Bach
4	commenting results, participation in living lab actions	Bach
5	reviewing	Bach
6	contribute to networking, workshops, dissemination	Bach

Expertise of organisation:

The Institut de Recerca i Tecnologia Agroalimentàres (IRTA) is public research institute aimed at conducting research on agriculture, animal production and welfare, fisheries, and food processing. The institute is formed by close to 500 people working in many different areas (soil, vegetables, animals, genetics, welfare, health...).
The Ruminant department of IRTA has ultimate objective the improvement of the competitiveness of the ruminant sector. Thus deparment conducts studies on metabolism, nutrition and management of ruminants and transfers the results to the productive sector through mathematical models and computer solutions. This research unit (created in 2003) has become a reference center in dairy (nationally and internationally) and is enhancing the productivity and competitiveness of the Spanish dairy sector through an effective Extension program and cooperation with the industry. The researchers of this department conduct studies on the metabolism and utilization of local raw materials, as well as studies on digestibility, management, cow comfort and welfare. In addition the department performs research and mathematical modeling based on data integration systems built from data collection schemes from the field. The department of ruminant production of IRTA has a research dairy farm with 100 lactating dairy cows, another with 100 beef animals, 250 meat ewes, and works closely with the largest contract heifer operation in EU (>6000 animals).

Scientific team (position, main roles and individual expertise):

Àlex Bach. Obtained a veterinary degree from the University Autonomous of Barcelona, Spain in 1994. Then moved to the United States to pursue a Master and a PhD in Dairy Science at the University of Minnesota (1994-1999). After graduating he

returned to Spain to work in the research department of a multinational feed company, where he built nutritional models for ruminants across Europe. Dr. Bach has received several awards in recognition to his research activity. In 1998, was the recipient of the Outstanding PhD Student Award by the Department of Animal Science of the University of Minnesota, and the Award to the Best Young Researcher in Animal Nutrition by the *Fundación Española para el Desarrollo de la Nutrición Animal* (FEDNA). In 1999, was the recipient of the Award to the Best PhD Student in Animal Sciences (ruminant branch) by the American Association of Animal Science. Dr. Bach has spoken at more than 40 international congresses, is author or co-author of more than 40 peer-reviewed publications, more than 50 extension articles, 3 books, and 3 book chapters. His main research focus is on dairy cow nutrition and management.

Marta Terré. Is a veterinarian with a PhD from the Universitat Autònoma de Barcelona (2006). She has conducted research in dairy replacement heifers and is now integrating data from all ewe producers of Cataluña (north of Spain) to allow benchmarking and continuous improvements. Dr. Terré is a young scientist with an excellent publication record.

Partner 8 Teagasc - the Agriculture and Food Development Authority (TEAG), Cork, (EI)

Role in project:		
WP	*Contribution:*	*Responsible*
1	Contribute to project meetings	Shalloo
2	active contribution to analysis for own country, reviewing	Shalloo
3	reviewing	Shalloo
4	commenting results, participation in living lab actions	Shalloo
5	reviewing	Shalloo
6	contribute to networking, workshops, dissemination	Shalloo

Expertise of organisation:

Teagasc is a semi-state organisation responsible for providing integrated research, advisory and training services for the agriculture and food industry in Ireland. Teagasc, The Moorepark Dairy Production Research Centre (MDPRC) has expertise in grazing systems, grassland management, animal health and welfare, reproductive physiology, milk quality, milking technology, dairy cow nutrition and farm economic modeling. It operates five individual research dairy units, totaling 320 hectares, and utilises over 800 dairy cows in the research programme. As well as development of competitive and sustainable grass-based systems of milk production within their research herds, Moorepark has an excellent working relationship with commercial farmers where several research studies and evaluation of new technologies are undertaken. Major clients include Irish Dairy Farmers, Irish Dairy Industry, Governments, EU, Pharmaceutical Industry, both AI and Grass Breeding Organisations. Over 45 scientific and technical professionals, supported by an administrative and operative team, staff the MDPRC.

Scientific team (position, main roles and individual expertise):

Dr Laurence Shalloo is a senior research scientist at Moorepark Research Centre, where his main areas of research are around the development and implementation of farm systems models to increase the economic and environmental sustainability of the dairy industry. He has been responsible for the continued refinement and development of the Economic Breeding Index (EBI) for the selection of dairy cattle in Ireland. He is leader of a project which is designed to develop a benchmarking system for the Irish dairy industry. He is currently coordinating a Department of Agriculture and Food (DAFF) Research Stimulus project on the development of a milk processing sector and dairy industry model. He is also involved in a further four DAFF Research Stimulus projects dealing with milk quota transfer, nitrate leaching, mitigation strategies for GHG emissions and the development of economic grass selection index. He provides a leadership role in the area of milk payment and optimum systems to the Irish dairy industry. Published more than 15 peer reviewed papers and more than 60 technical publications. Education: 1999 – B.Agr.Sc University College Dublin; 2004 - PhD University College Dublin.

Anne Geoghegan is a technologist at Moorepark Research Centre, where her main areas of research are around the development and implementation of a research reporting system for the ongoing research as well as the development of a benchmarking system for dairy farmers. She is responsible for the development of automated systems of data collection across the 6 Moorepark farms. She is currently heavily involved in the development of an automated transfer mechanism to allow data flow between a number of different institutions and the newly developed Benchmarking database.

Partner 9 Universität Rostock (ROST), Rostock (DE)

Role in project:		
WP	*Contribution:*	*Responsible*
1	Contribute to project meetings	Nash
2	Provide input regarding current situation within and without the agricultural industry	Nash
3	Assist development of platform based on provision of project websites for *pre agro* and FutureFarm	Nash
4	Liason with FutureFarm project and impact of crop production standards on reference framework	Nash
5	Assist preparation of SRA based on experience in IT, GIS and Precision Agriculture research	Nash
6	Maintain contact with FutureFarm project and assist with other dissemination activities	Nash

Expertise of organisation:

Rostock University is northern Europe's oldest university, founded in 1419. The Faculty of Environmental and Agricultural Sciences (AUF, see www.auf.uni-rostock.de), one of the university's ten faculties, dates back to 1942 and is composed of four institutes totalling 200 permanent staff (teaching, research and support) as well as a large number of scientists financed by third-party funding. The faculty pursues an interdisciplinary research agenda focussing on the environmentally responsible use of rural areas.
The Chair of Geodesy and Geoinformatics (see www.auf.uni-rostock.de/gg) at the Institute for Management of Rural Areas in particular has around 15 years experience in research on precision farming, and especially information management for knowledge-based agriculture. As part of the first round of the German government funded *pre agro* project, research was carried out into the use of digital terrain models and remote sensing as data sources and metadata management as an important component for effective use of available knowledge. Work in the second *pre agro* project focused on theoretically modelling common workflows and data types and supporting farmers' and their partners' work through use of geospatial web services together with agricultural standards such as agroXML. The use of web services for supporting decision making is also being researched with application in municipal administration. Additionally, research work is carried out in the fields of geosensor networks and on development of aerial-based digital low-cost image systems for agricultural and urban applications.
The Chair of Geodesy and Geoinformatics is leading Work Package 4 of the FP7 project "FutureFarm" (FP7-KBBE-CT-2008-212117). Other AUF involvement in EU-funded projects includes the planning disciplines (projects in INTERREG IIIB CADSES Programme), soil sciences (ProWater, Marie Curie programme) and agricultural economy (Protector, Remcolm). Fundamental research projects are financed by DFG, applied research is also funded by different national ministries (BMBF, BMVEL, BMWI) and other national and federal funding organisations (DBU, VW).

Scientific team (position, main roles and individual expertise):

Prof. Dr. Ralf Bill is Professor of Geodesy and Geoinformatics. Professor Bill, born in 1955, studied geodesy at Mainz, Berlin and Karlsruhe. He worked as scientist at Karlsruhe University (1979-1985) and Stuttgart University (1989-1994). In the years 1985 until 1989 he was a GIS-hardware- and software-development engineer at Wild Heerbrugg (Switzerland). He was appointed Professor for Geodesy and Geoinformatics at Rostock University in 1994. Prof. Bill is the author of the standard German-language university textbooks on GIS, with research interests spanning the areas of spatial data infrastructures, internet GIS, sensor networks, positioning technologies and applications in precision farming, administration and tourism. In 1999 Prof. Bill established the first Steinbeis Transfer Centre for Geoinformatics at Rostock University, which supports the transfer of scientific results into practical applications.

Dr. Edward Nash is a research associate working at the Chair of Geodesy and Geoinformatics. He holds a BSc in Mapping Information Sciences and a PhD in Geomatics from University of Newcastle-upon-Tyne, UK. He is the work package leader of WP4 of the "FutureFarm" FP7 project focusing on knowledge management in the farm management information system of tomorrow. Previous research included the modelling of information- and workflows in precision farming and the implementation of distributed web-services based on ISO and Open Geospatial Consortium standards, together with agricultural standards such as agroXML, to support and automate these. Dr. Nash will be the major contributor to this project from Rostock University.

Dr. Peter Korduan is a research associate working at the Chair of Geodesy and Geoinformatics. He holds a Diploma in Geodesy from TU Berlin and a PhD in Metainformationsystems for Precision Agriculture from Rostock University. He is a board member of the German Society for IT in Agriculture, Forestry and Food Production and a member of the KTBL expert group "Geodata and agroXML" and the KTBL working group "Application of geoinformation in agriculture" and co-author of the book "Geoinformation im Internet – Technologien zur Nutzung raumbezogener Informationen im WWW" (*"Geoinformation in the Internet – Technologies for Using Spatially-Referenced Information in the WWW*").

Partner 10 Forschungsinstitut für Biologischen Landbau (FIBL), Frick (CH)

Role in project:

WP	*Contribution:*	*Responsible*
1	Contribute to project meetings	Sanders
2	active contribution to analysis for own country, reviewing	Sanders
3	reviewing	Sanders
4	commenting results, participation in living lab actions	Sanders
5	reviewing	Sanders
6	contribute to networking, workshops, dissemination	Sanders

Expertise of organisation:

The Research Institute of Organic Farming (FiBL), a private foundation founded in 1973, is one of the world's leading organic and sustainable farming research and technology transfer centers. FiBL employs over 120 members of scientific and technical staff. It has nine research divisions (Annual Crop Production, Perennial Crop Production, Plant Protection: Diseases & Antagonists, Plant Protection: Pests and Beneficial Insects, Animal Health, Animal Husbandry & Animal Breeding, Veterinary Parasitology, Food Quality, and Socio-Economics).

Key competences
FiBL Socio-Economics Department has substantial competences in policy impact assessment, economic sector modelling (FARMIS), evaluation of agri-environmental policies, policy network analysis and scenario analysis. The Socio-Economics Department co-ordinated the EU projects „Further development of Organic Farming Policy in Europe, with Particular Emphasis on EU Enlargement" (EU-CEEOFP, FP6) and "Evaluation of the European Action Plan for Organic Food and Farming" (ORGAP, FP6) and "Developing the entrepreneurial skills of farmers" (ESoF, FP6). Furthermore, it has been involved in various other EU-funded research projects dealing with model and data integration such as "Micro-economic instruments for impact assessment of multifunctional agriculture to implement the Model of European Agriculture " (MEAscope, FP6) or "European Information System for Organic Markets" (EISfOM, FP5).

Model-based policy assessment is requiring a large amount of farm data such as book-keeping data, farm structure survey data, normative data, life-cycle assessment data, market data, etc. In most cases, data sources are not harmonised since they are coming from different data families. In this project FiBL provides expertise in improving the interface between farm data and policy model aiming to facilitate the use of such data for policy modelling.

Scientific team (position, main roles and individual expertise):

Dr. Jürn Sanders (Senior Researcher) is involved in research on agricultural policy, economics of organic farming and model based policy assessments. At the institute he is responsible for the use and development of farm-based policy models and IT interfaces. He has been involved as project leader and researcher among others in the EU projects EconWelfare, COFAMI, CEEOFP, ORGAP and OMIaRD and is member of the European FARMIS modelling network.

Dr Matthias Stolze is the head of FiBL Socio-Economics Department. He is lecturer for Agricultural Policy Evaluation at ETH Zurich, Switzerland and for Economics of Organic Farming at the University of Hohenheim, Germany. He has been member of the scientific advisory group to the European Commission on the European Action Plan for Organic Farming and scientific co-ordinator of the EU project CEEOFP. He is involved in EU-wide research with respect to socio-economic and policy impact of sustainable agriculture. Dr Stolze acts as reviewer for the international journals Food Policy and Journal of Agricultural and Environmental Ethics.

Otto Schmid (Senior Researcher) is involved in research on farm economics, marketing, analysis of agricultural policies and rural development. Since 1980 he has been working with the development of standards/regulations for Organic Agriculture, being co-ordinator of the Standards Committee of IFOAM (International Federation of Organic Agriculture Movements) for 8 years and representing IFOAM in Codex Alimentarius work since 1993. He is chair of the research subcommittee in IFOAM EU Group. From 1976 until 1990 he was co-ordinator of the farm advisory service of the FiBL. He has been involved since many years in several EU projects and was coordinator of the EU project ORGAP. In 2008 he was appointed as expert in the Foresight Consultancy Expert group of SCAR-DG Research.

Partner 11 Altavia (ALTA), Bologna (IT)

Role in project:

WP	*Contribution:*	*Responsible*
1	Contribute to project meetings	Giannerini
2	Coordinator of focus group of Mediterranean countries	Giannerini
3	Collaboration in designing the platform	Turchi
4	Collaboration in use case Geo-farmer and fertilizing	Turchi
5	Validation of SRA by Italian stakeholders	Giannerini
6	Organization of events in Italy	Giannerini

Expertise of organisation:

AltaVia is a small IT company with the mission of developing Web based IT platforms in the field of data gathering & management. The main business areas are:

- Agriculture & Food Industry
- Government & Public administrations
- Health care

Founded: Bologna, Italy in 2000, merging existing firms
Turnover: ~ 500.000,00 €
Employees: 10

Company skills

- software development using object oriented programming & "Agile" techniques
- large database design & management
- XML & Web Services driven integration experiences
- national & European RT&D projects experiences
- wide range of sectors covered (Industries, Public Administrations, Hospitals)

Key competence

In the agri.food sector AltaVia has gained experience in integrating several data sources using different standards. Most of the online IT services managed by the company require a network of external information providers.
All the IT services implement XML (HL7 in health care) as standard output. Programmers are skilled in developing Web service to manage the data integration. AltaVia is member of the regional working group for traceability data standardization (Emilia Romagna Region). The company platform EtiNET (web based platform for traceability in the food sector – www.etinet.biz) is the largest adopted platform in Italy managing thousands of food lots daily.

Scientific team (position, main roles and individual expertise):

Gianfranco Giannerini (CEO) is involved in research on traceability techniques, irrigation scheduling & best practice in water management. At the company he is responsible for the services management and data network set up. He has been involved as partner in the EU projects HYDRA. Reviewer in the Annual Review 1996 of the project in TURA (UR) sector. Coordinator of AITICA Italian association of ICT in agriculture, linked with EFITA

Andrea Turchi (engineer - senior programmer) has skills on AGILE software production techniques (Italian member) and he is graduate hydraulic engineer. He has been involved in many Italian research projects concerning GIS & water management. At the company, he is the chief of EtiNET project.

Partner 12 Poznan University of Life Sciences (PULS), Poznan (PL)

Role in project:

WP	*Contribution:*	*Responsible*
1	Contribute to project meetings	Weres
2	active contribution to analysis for own country, reviewing	Weres
3	reviewing	Weres
4	commenting results, participation in living lab actions	Weres
5	reviewing	Weres
6	contribute to networking, workshops, dissemination	Weres

Expertise of organisation:

Poznan University of Life Sciences (PULS) is a state institution of higher education composed of 8 faculties, it is one of the biggest and well-known Polish universities of that kind. The University offers education in 13 fields of study within the framework of 8 faculties organized into institutes and departments. The offered curricula meet both the scientific progress and the needs of modern agriculture, forestry and broadly meant food economy. Research facilities are expanded by strict cooperation with the agri-food and forestry production, and 12 experimental stations covering the area of 15 thousands hectares of arable land and forests play a significant role in research and teaching. Within the University the leading role in developing advanced ICT infrastructure for the agri-food and forestry sectors is played by the Institute of Agricultural Engineering. Research activities related to ICT are concentrated mainly on developing methods for computer support in analyzing, designing and managing agricultural systems, and particularly on developing advanced decision support web applications, based on systems engineering, knowledge engineering, inverse FEA and neural modeling, image analysis and GIS. The researchers are experienced in national and international scientific collaboration within many project, including the 5th and 6th Framework programs of the Commission of the European Union.

Scientific team (position, main roles and individual expertise):

Prof. dr hab. Jerzy Weres professor and head of the Department of Applied Informatics of the Institute of Agricultural Engineering of the Poznan University of Life Sciences. His research domain is agri-food engineering, he is involved in development of advanced internet applications supporting analysis, design and management of agri-food systems. His main research areas are: modeling of complex empirical systems, and modern technologies for software development, including UML 2.x, C++/CLI and C# 3.0 (.NET 3.5). He was involved in many national and international research projects as a project leader. He is a board member of the European Federation for ICT in Agriculture, Food and the Environment (EFITA) and president of its Polish national member organization (POLSITA). He is also a member of other national and international scientific societies and

councils.

Dr hab. Wojciech Mueller professor at the Department of Applied Informatics of the Institute of Agricultural Engineering of the Poznan University of Life Sciences. His research domain is agri-food engineering, he is involved in development of advanced internet applications supporting analysis, design and management of agri-food systems. His main research areas are: systems analysis and data modeling (UML 2.x, .NET 3,5), and advanced technologies for database management systems. He was involved in several research projects as a project leader. He is a board member of the Polish Society for ICT in Agriculture, Forest and Food Production (POLSITA).

Dr Janina Rudowicz-Nawrocka senior researcher at the Department of Applied Informatics of the Institute of Agricultural Engineering of the Poznan University of Life Sciences. Her research domain is agri-food engineering, she is involved in developing ICT and GIS technologies for agri-food systems and sustainable development. She was involved in several research projects as a researcher. She is a board member of the Polish Society for ICT in Agriculture, Forest and Food Production (POLSITA) and a member of the Polish Association of Spatial Information (PASI).

Partner 13 Acta Informatiqe (ACTA Info), Paris, France

Role in project:

WP	*Contribution:*	*Responsible*
1	Contribute to project meetings	Waksman
2	-	-
3	-	-
4	-	-
5	-	-
6	Coordinator, supplying contact network, organizing workshops and advisory committee, dissemination	Waksman

Expertise of organisation:

ACTA Informatique is a subsidiary of different French Agricultural R&D organizations controlled by the farmers' unions and the French state, subsidiary devoted to Information and Communication Technologies, and their uses to process experimental results and field surveys, to develop data bases, CD-ROMs, web sites and decision support systems, to make easier internal and external communication, etc.
ACTA Informatique has been involved in the development of New Information and Communication Technologies for farmers and rural areas since 1981. For the last years, ACTA Informatique is developing ICT training courses; CD-ROMs, web sites.
ACTA Informatique participated in a number of French / European R&D, and e-Learning projects.
Since 1997, ACTA Informatique is the editor of a weekly electronic newsletter (in French) distributed free of charge to more than 25000 subscribers (December 2008), newsletter devoted to ICT for agriculture and rural areas. Advertisements of products and services proposed by companies cover the costs of developing such a huge mailing list and of writing a weekly newsletter of 15 to 20 pages (see: http://www.acta-informatique.fr).
The weekly EFITA newsletter by ACTA Informatique in English is distributed world wide to some 4000 subscribers around the world (see: http://www.efita.net).
For the last years, ACTA Informatique has been involved together with Agro EDI Europe in two French R&D projects:

- GIEA (gestion de l'information de l'exploitation agricole), founded by the French ministry of Agriculture, the results of which are concept definitions and data dictionaries (See: www.projetgiea.fr)
- RESAGRI (Towards a networking agriculture…) founded by the French ministry of Finances, the results of which are many:
  - § introduction of XML for new messages (old messages are EDI messages) and even ebXML standards
  - § normalisation of previously existing messages (UN / CEFACT-TBG 18) and development of new messages
  - § information of many actors about the methods and technologies proposed (normalisation, XML, ebXML)

In 2009-2010 ACTA Informatique will coordinate a new R&D project call GI-E-EA that will be founded by the French ministry of Agriculture. The GI-E-EA project will deal with agro-environmental traceability. It will focus attention and inputs, water and energy consumptions.
Agro EDI Europe is involved in this GI-E-EA project as will as different R&D Institutes (among them Cemagref).
The French ministry of Agriculture will follow the GI-E-EA project. Its objective is to simplify e.g. cross-compliance and environmental control procedures: if a new regulation has to introduced, it should require only data identified and completely described within the GI-E-EA project to guarantee that data collection will not be costly specially for the farmers themselves.

Expected role of ACTA Informatique
ACTA Informatique is mainly representing EFITA - the European Federation for ICT in Agriculture, Food and the Environment. EFITA is further described in Annex IV. Guy Waksman, Director of ACTA Informatique, is a former President of AFIA (Association Francophone d'Informatique Agricole), which is the French national member organization of EFITA.
The role of ACTA Informatique, on behalf of EFITA, in the agriXchange project is concentrated in WP6 Stakeholder Integration and Dissemination and will be:

- Providing the EFITA network of contacts to disseminate the activities and results in Europe
- Editing the weekly EFITA newsletter to inform its subscribers about the agriXchange project, and to maintain the EFITA community aware of the strategic importance of data exchanges
- Maintaining the EFITA web site
- Organizing national and international seminars to ensure that industrial operators as well as ICT companies will integrate the data dictionaries and messages in their software tools.

Scientific team (position, main roles and individual expertise):

Guy Waksman
58 years, French
- Education: Agronomist and School of management
- Languages: English, German
- Former president of A.F.I.A.: Association Francophone d'Informatique Agricole
- Editor of a weekly electronic newsletter about ICT for agriculture and rural areas, newsletter distributed to more than 25000 people all around the world. Another newsletter in English in distributed to more than 4000 people.
- Director of ACTA Informatique, an IT company subsidiary of French national agricultural R&D organisations. ACTA Informatique is offering IT services (web sites and software development, server hosting, etc.) and helps its shareholders in their IT projects.
- Involved in different EC R&D projects.
- Expertise and review of French and EC R&D projects.
- Many papers published in French or English.

Sylvie Masselin-Silvin
42 years, French
- Education: Agronomist and Computer Scientist, Statistical Searcher
- Languages: English
- Involved in different EC R&D projects: ADDA (Agricultural Data Dictionaries and Analysis) and AGRIMMEDIA (development and promotion of Multimedia tools for Agricultural and Agro-food industries).
- Involved in GIEA and GE-E-EA projects.
- IT trainer: Microsoft software, Internet, SAS statistical package.
- Software development and web sites design.
- Organisation of national and international seminars about ICT for agriculture and rural areas (56 seminars organised since July 1997).

Partner 14 Progis software GmbH (PROG), Villach, Austria

Role in project:

WP	*Contribution:*	*Responsible*
1	Contribute to project meetings	Mayer
2	Provide input especially to T2.1 and T2.2	Manukyan
3	Contribute to content based of PROGIS expert model as well as GlobalGAP field pass needs	Writzl
4	Contribute to the use cases with a pilot project of Rapid Eye images for precision farming	Aigner
5	Provide input especially to O5.3	Manukyan
6	Contribution in the dissemination with focus to Central and Eastern Europe	Mayer

Expertise of organisation:

PROGIS Software GmbH is a specialist in the development of **G**eographic **I**nformation **S**ystems (**GIS**) with focus on applications for rural areas With the core-product WinGIS, a Windows based object-oriented and hybrid GIS, PROGIS offers applications for agriculture, forestry, ecology, risk- and land management, for logistics, community- and utility management, GeoINFOtainment, precision- and virtual farming but also for governmental solutions like land consolidation or the development of a cadastre. In addition PROGIS focuses on organisational tasks, political awareness, professionalism and competence, training, know-how transfer and capacity building under sustainable principles.
PROGIS pursues holistic solutions and considers the whole production chain from the farmer to the end user. In addition to the requirements of the farmers, those of upstream/downstream industries of the food-feed or energy processing chain can also be included. Besides turnkey solutions for single users, PROGIS offers solutions for regional groups, advisory services and integrated solutions for regions and whole countries.

Scientific team (position, main roles and individual expertise):

Walter H. Mayer, graduate engineer, CEO of PROGIS Software GmbH.
Mr. Mayer graduated from the agricultural high school in Raumberg/A and holds an advanced engineering degree for forestry and woodwork technologies, torrents and avalanches from the University for Life Science and Natural Resources, Vienna/A.
After graduation, Mr. Mayer was assistant at the forestry business of Prince Karl Schwarzenberg and between 1978 and 1985 was the general representative for the Apple and Acer computer companies in Austria. In 1984 he started his own civil engineering and agro/forestry/ecology consulting office. Later he began with the development of software for the management of forest and agricultural enterprises and founded PROGIS. Since the mid eighties, he has also managed his own agriculture and forestry enterprises.
Mr. Mayer has excellent national and international contacts in the agricultural sector and is expert witness in forestry, environment and real estate appraisals.

Renate Writzl has farming background and examined the college for agriculture and has a degree of an advanced technical college. Her branch of study was: „Telematics/Networktechnic“. Her key-role is the support of AGROffice. She has an excellent know-how in object-oriented programming.

Bernhard Aigner has examined the college for EDP and organization in Villach. Since 1999 he is employed with PROGIS Software GmbH. His main tasks are the development of GIS-systems and Web-solutions, but also the updating and the technical Support.

Arman Manukyan as the marketing director for Eastern Europe strongly engaged in the development and implementation of a new approach to Farm Advisory Services as a business partner. Worked in close relationship with Farm Advisory Services in various countries of the region to promote the innovative approach to modern farm documentation and to business opportunities with agricultural banks and insurance companies, as well as worked with food/feed exporters (especially to EU countries) to raise the awareness on food traceability issues.

B.2.3 Consortium as a whole

B.2.3.1 Consortium composition - a three-layered approach

The project consortium consists of 14 partners. LEI-WUR is also representing its sister institute Alterra-WUR by posting people to LEI-WUR. Poznan University of Life Sciences (P12) will subcontract Krakow University. So, the actual number of organizations involved is 16.
To have a manageable and financially feasible consortium, a three-layered approach for networking and dissemination is chosen, schematically represented in Fig. 12.

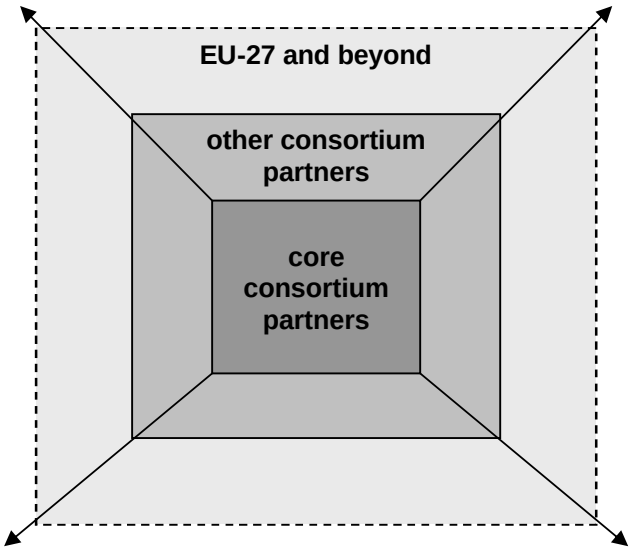

Fig. 12 Three-layered approach of networking and dissemination

The first layer, the **core consortium** consists of the partners

P1 (LEI-WUR, NL)
P3 (KTBL, DE)
P4 (MTT, FI)
P5 (WRLS, CZ)
P6 (ELEV, FR)

that already closely cooperate on this topic for several years. They also represent the model countries for standardization in agriculture (see section B.1.1.5) and in general they have a leading role in Europe in the area of precision agriculture.

Role of the core consortium is that they do most substantial part of the work in the work packages. The senior representatives of these core partners form the steering committee that, together with the overall project coordinator P1, coordinate the project and share the responsibility of the progress and results.
The second layer is formed by the other partners that mainly complements for the geographical coverage, which is important to get whole Europe involved (see Fig. 13). Besides, two new member states are involved (PL, CZ)

Fig. 13 Geographical coverage of the agriXchange consortium

The partners in the second layer mainly play a role in WP2, the analysis of the state of the art in Europe and in stakeholder integration and dissemination.
The third layer is not part of the consortium, but will be involved through international workshops, the advisory committee and through the analysis in WP2. Besides, the agriXchange platform (WP3) is also open for the public.

B.2.3.2 Complementarity between participants

Table 3 gives an overview of relevant characteristics of the consortium partners and topics in which they are involved. The balance in characteristics and topics indicates the complementarity between participants.
All main contractors are experienced, senior researchers with a clear central competency, and an outstanding knowledge of their own discipline. Quite a number of partners are from applied research, indicating that there is a strong link with farming practice. The more scientific background of several partners ensures input of the state-of-the-art insights in science. Several partners have a strong background in important topics like standardization, precision agriculture, spatial data, etc. that were described in section 1. A few partners have a large background in communication and extension that are highly relevant for stakeholder integration and dissemination. Two SME's from software development are involved. In

conclusion, the partnership ensures high level scientific knowledge within a multi-disciplinary project consortium with linkages to practice.

Table 3 Overview of relevant characteristics of the consortium partners and topics in which they are involved

		relevant characteristics and topics*													
partner no.	**short name**	livestock	arable	precision agriculture	organic agriculture	spatial data	ICT	standardization	agri-environment	traceability	extension	communication	applied research	scientific research	SME
1.	LEI-WUR		++	++	+	++	++	++	+	+			++	+	
2.	ASG-WUR	++	+	++	++	+	++	++	+	++			++	+	
-	KTBL	++	++	+	+	+	++	++	+	+	++	++	+	+	
3.	MTT	+	++	++	+	++	++	+	++	+	+	+	++	+	
4.	WRLS		++	++	+	++	++	++		+	+	++	+		
5.	ELEV	+ +		+	+		+	+ +	+	+ +	+	+	+ +		
6.	IRTA	++				+		+			+	+	++	++	
7.	TEAG	++		+	+	+	+	+	+	+	++	++	++	++	
8.	ROST		+	++		++	++	+	+				++	++	
9.	FIBL	+	+		++	+	+		+		++	++	++	+	
10.	ALTA	+	+			+	++	+	++	++		+			++
11.	PULS		+	+	+	+	++		+		+		+	++	
12.	ACTA Info	+	+	+	+		++		+	+	++	++	++		
13.	PROG	+	++	++	+	++	++	+	++	++	++	++	++	+	++

* ++ strong relationship + medium relationship

B.2.3.3 Links to relevant organizations

Several persons have strong links with organizations that are highly relevant to sustaining the results of the project (see Table 4). Through these organizations a link as made to industrial and commercial organizations, which are potential users of the project results

Table 4 Relevant organizations and consortium members that are related

organization	**persons from consortium involved**
EFITA - European Federation for ICT in Agriculture, Food and the Environment	Sjaak Wolfert (president); board members: Karel Charvat, Guy Waksman, Jerzy Weres
UN/CEFTACT CENagro	delegates: Martin Kunisch, Frans van Diepen, Henri Holster
OGC	Karel Charvat, Daniel Martini, Edward Nash
ISOBUS	Daan Goense, Martin Kunisch
CIGR (International Commission of Agricultural Engineering)	Jerzy Weres (representative of the National Committee responsible for cooperation with CIGR)
European Network of Living Labs (ENOLL)	Karel Charvat, Sjaak Wolfert
ISOagriNET	Martin Kunisch , Daniel Martini
RurSDI INSPIRE SDIC Sensors Observation Working Group for GMES EUROGI	Karel Charvat Karel Charvat Karel Charvat
ISO/SC19/WG3 (Animal RFID)	Béatrice Balvay as expert
International Committee of Animal Recording (ICAR)	Jean Michel Astruc (Chairman of the small ruminants working group) Erik Rehben (Chairman of the animal data records task force)
World Organisation for Animal Health - OIE	Erik Rehben (ICAR representative)
Supply Chain Council (SCC) with Supply-Chain Operations Reference-model (SCOR)	Cor Verdouw (member)

B.2.3.4 Subcontracting/relationship between partners

- WirelessInfo (P5) is subcontracting Hep Service Remote Sensing and Lesprojekt for €10,000 in WP3, who are responsible for developing of platform components. They are both members of WirelessInfo. and we cover part of developing works trough our members.
- Poznan University of Life Sciences (P12) is subcontracting Krakow University for €2,500 in WP4 to have a wider participation from Poland.

A brief description of the subcontractors are provided in Annex V

- LEI-WUR (P1) and ASG-WUR (P2) are related with each other because they are both part of Wageningen University and Research Center (WUR). People from Alterra-WUR are also involved in the project, but they are detached to LEI-WUR.

B.2.3.5 Third parties

Part of AgriXchange's work is foreseen to be carried out by LEI-WUR and ASG-WUR through resources provided by Stichting Dienst Landbouwkundig Onderzoek (Stichting DLO), established in Costerweg 50, 6701 BH Wageningen, The Netherlands. LEI-WUR reimburses the costs of third party Stichting DLO.
The financial contribution involved is as detailed in the table below.

WP No	Workpackage title	Labour costs involved (€)		Overheads (€)		EU requested contribution (€)	
		LEI WUR	ASG-WUR	LEI WUR	ASG-WUR	LEI-WUR	ASG-WUR
1	Project coordination and management	76.000	0	38.000	0	95.230	6.420
2	Analysis of current situation in EU 27	3.800	31.500	1.900	23.310	4.066	33.705
3	Set up of agriXchange platform	3.800	6.300	1.900	4.662	4.066	6.741
4	Development of a reference framework for interoperatibility	53.200	3.150	26.600	2.331	56.924	3.371
5	Synthesis, recommandations and defining of the SRA	15.200	6.300	7.600	4.662	16.264	6.741
6	Stakeholder integration and dissemination	15.200	6.300	7.600	4.662	24.289	9.951
Total		**167.200**	**53.550**	**83.600**	**39.627**	**200.839**	**66.929**

B.2.3.6 Supporting partners

There are two supporting partners that will be involved in the project in project meetings and workshops, but who are no official partners and therefore not responsible for the project results. This mainly has a historical background as they were already always involved in meetings on the subject of agricultural information exchange. However, they are not interested in official participation, because they are governmental bodies, which are excluded by law from getting subsidies in EU-FP7. It concerns:

- Department of Agriculture Nature and Food safety, National Service for the implementing of regulations, The Netherlands
- Department of Agriculture, France

These partners, and their expected role in the project are provided in Annex III.

B.2.4 Resources to be committed

B.2.4.1 Management level description of resources and budget

Explanation for the different costs

Personnel costs

Personnel costs are calculated on the basis of the effective monthly salary rate for each partner and the estimated number of person-months necessary for carrying out of project activities. Partners, which are responsible for a work package have additional person months for coordination; this is included in the work package budget. The ratio of person months between the work package is shown in Table 5.

Table 5 Person months for each work package and the ratio between them

Work package		person months	ratio
WP1	Project coordination and management	**10**	9%
WP2	Analysis of current situation in EU 27	**23.5**	20%
WP3	Set up of agriXchange platform	**20.5**	18%
WP4	Development of a reference framework for interoperability	**31**	27%
WP5	Synthesis, recommendations and defining of the SRA	**15.5**	13%
WP6	Stakeholder integration and dissemination	**15.75**	14%

Other costs

Due to the relatively intensive debate character of the coordinating and support action, there will be quite a number of meetings: project meetings, international workshops and advisory committee (see section B.1.2.2). This largely explains the relatively high travel costs that constitute mainly the other costs that are shown in Table 6. These costs are explained below.

Table 6 Other costs for the project per partner, allocated to the work packages

participant nr/ short name	allocated other costs						
	WP1	WP2	WP3	WP4	WP5	WP6	Total
1 LEI-WUR	13000	0	0	0	0	7500	**20500**
2 ASG-WUR	6000	0	0	0	0	3000	**9000**
3 KTBL	6000	0	0	0	0	3000	**12000**
4 MTT	6000	0	0	0	0	3000	**9000**
5 WRLS	6000	0	3000	0	0	3000	**9000**
6 ELEV	6000	0	0	0	0	3000	**9000**
7 IRTA	6000	0	0	0	0	3000	**9000**
8 TEAG	6000	0	0	0	0	3000	**9000**
9 ROST	6000	0	0	0	0	3000	**9000**
10 FIBL	6000	0	0	0	0	3000	**9000**
11 ALTA	6000	0	0	0	0	3000	**9000**
12 PULS	6000	0	0	0	0	3000	**9000**
13 ACTA Info	6000	0	0	0	0	61000	**67000**
14 PROG	6000	0	0	0	0	3000	**9000**
Total	**91000**	**0**	**3000**	**0**	**0**	**104500**	**198500**

Travel and subsistence

In general, we use the following cost indicators:

travel costs:	€400
accommodation:	€100
daily allowance:	€175
subsistence:	€75

- The costs for the project meetings are allocated to WP1. There are 5 project meetings of 2 days with 2 delegates for each partner, except LEI-WUR has 4 delegates because they have a coordinative as well as a substantive role. There are no daily allowances used.
- The costs for the workshops are allocated to WP6. There are 3 workshops of 2 days with 2 delegates for each partner, except LEI-WUR has 4 delegates because they have a coordinative as well as a substantive role. The final project meeting coincides with the third workshop so that costs for the project partners are saved. Additionally, €18,000 was reserved for inviting experts to the workshops that are reimbursed based on the same cost indicators. There are no daily allowances used. Other participants have to pay a fee to cover the costs.
- The costs for the advisory committee are allocated to WP6. There are 2 meetings of 1 day and we accounted for 10 committee members. The committee will be larger, but we assumed that some members (e.g. for EU organizations) don't need reimbursement.

Durable equipment
- Laptop for project coordination in WP1: €1,000
- Server capacity for the platform in WP3: €3,000

Other specific project costs
- Printing of the final report: €1,500, allocated to WP6. For reporting dissemination mostly e-publications will be used, but for some purposes hard copies will be useful. The costs for this are kept low, because internal facilities of LEI-WUR can be used for this.
- For the project meetings we keep the material costs to a minimum by using facilities of the partners. However, to attract participants to the workshops, more representative locations should possibly be chosen, so a budget of €15,000 reserved for this, allocated to WP6.
- We expect that in some countries the English language is not suitable for communication and reaching the right stakeholders. We try to rely on the facilities of all partners as much as possible, but still we reserve €10,000 for translation costs allocated to WP6.
- Because all budgets per partner are less than €375,000 no costs for audit certificates are needed.

B.3 Potential impact

This section describes the expected impacts of the project in relation to the EU work program and how these will be achieved through engagement with stakeholders outside the network, and the public at large.

B.3.1 Expected impacts listed in the work program

First, the general contribution to the Knowledge-Based Bio-Economy and the specific area in which this project call was placed in will be described. Secondly, the contribution to expected impacts of this specific project call and necessary steps to bring about these impacts will be described. We then show why a European research approach is necessary instead of a national one. Finally, we provide several external factors that could hamper reaching the

expected impacts. In the description we will refer to several international research activities. For the relevant national research activities, we refer to the annex I.

B.3.1.1 General contribution to KBBE and area 2.1.4

The general objectives of the Knowledge-Based Bio-Economy (KBBE) in the cooperation work program 'Food, Agriculture and Fisheries, and Biotechnology', can be briefly described as:

- bringing together science, industry and other stakeholders
- exploit new and emerging research opportunities
- address challenges for sustainable development (environmental, social, economic)

In the work program, there is a more specific focus in the approach for 2009 on several topics:

- the rapid transformation of the agricultural sector, at the same time accounting for sustainable growth and employment and opening markets to other countries (globalization)
- interlinked trends (e.g. climate change, feeding world population, rural economy, etc.) that are visible in several EU agenda's
- structuring the European Research Area (ERA), enhanced by specific actions, strengthening the relation between the EU and its member states
- contribution to SME-relevant research, socio-economic research and international cooperation

Area 2.1.4, of which this project call is part of, specifically deals with 'socio-economic research and support to policies'. This is about:

- tools for policy makers and other actors to support implementation of relevant strategies, policies and legislation

In the following paragraphs, we will briefly describe how this project will contribute to these objectives and topics.

Bringing together science, industry and other stakeholders

From the consortium description in section B.2.3, it can be derived that there is a mixture of partners ranging from scientific research (P9, P12), applied research (P1, P2, P3, P4, P6, P7, P8, P10) to ICT industry (P5, P11, P14). Besides there are several partners that have a specific background in stakeholder integration (P13). The emphasis on applied research also ensures that there is a strong link with practice (farmers). As presented in annex III there is a strong involvement from two national governments. The Living Lab approach that is applied in WP4 implies a strong, interactive approach with all relevant stakeholders within a certain domain. WP2 will initiate the network building, which is elaborated more deeply in a series of European workshops and the agriXchange platform that is built in WP3. The advisory committee also represents stakeholders from different backgrounds.

Exploit new and emerging research opportunities

Mainly two new or emerging research opportunities can be identified in this project: the living lab approach and the service-oriented architecture (SOA) based on reference process modeling. The living lab approach fits into the current trend towards more open innovation that opens up more possibilities for research and development for SMEs. There is an emerging movement of living labs within the EU[10] and there are several strong links with consortium partners with this network (see section B.2.3.3). The SOA-approach and reference process modeling is an established paradigm but in practice there are not yet many examples of successful applications. This links up with challenge nr. 2 'Pervasive and Trustworthy Network and Service Infrastructures' in the EU-ICT program[11]. Standardization is also very much related to 'Digital Libraries and Content', which is another important challenge in the same program.

Address challenges for sustainable development (environmental, social, economic)

It was stated in the introduction that information sharing, and therefore standardization, is an important prerequisite to support solving issues such as food safety, animal welfare, sustainable use of resources, efficient production, etc. This can also be derived from the large list of use cases in which information sharing or standardization plays a role. Moreover, the problem statement indicated that an important challenge is to meet requirements from different data standards related to these various issues (cross-compliance). The harmonization approach, mainly in WP4, addresses this requirement. It will also contribute to the general objective of relief of administrative burden.

Rapid transformation of the agricultural sector, at the same time accounting for sustainable growth and employment and opening of markets to other countries

Important developments in agricultural development in this respect are internationalization and supply chain integration. Currently, an ad-hoc approach to standardization, focused at national level, hampers these developments. This project contributes to a solution by providing a sustainable framework (technological and organizational) and setting a strategic agenda at a European level to anticipate these rapid changes. Through the consortium and their activities, this project guarantees that all European countries get equal access and can be involved in the knowledge that is constructed.

Interlinked trends that are visible in several EU agendas

The project itself is not directly focused on large, global trends (e.g. climate change, feeding world population, rural economy, etc). However, as already indicated, it addresses several sustainability challenges that are linked to these trends. For example, the geo-fertilizer case can contribute to more efficient use of energy and thus to sustainable energy issues. Developing the SRA in WP5 will take these interlinked trends into account.

Structuring the European Research Area (ERA), enhanced by specific actions, strengthening the relation between the EU and its member states

As indicated in the introduction, there are several complex research and development challenges connected to the problem statement of this project. This project will provide a sustainable platform and framework that helps to structure this problem area at a European level. Through the project consortium and its activities the relationship between member states will be highly supported. Development of the SRA in WP5 explicitly contributes to this issue.

[10] see www.openlivinglabs.eu
[11] see http://cordis.europa.eu/fp7/ict/programme/home_en.html

Contribution to SME-relevant research, socio-economic research and international cooperation

SME's, in particular ICT and farm technology companies, are the main target group of this project. Ultimately they have to use and implement the standards in their products and thus are the end users of new technologies. Within the project consortium, several SMEs are directly involved. Through the workshops a larger range of SMEs will be involved in development of the project results. In the other direction, from WP6 it is planned to have an active contribution to other initiatives in which SMEs are involved (e.g. Manufuture, FutureFarm, C@R).

Through inclusion of other types of partners in the consortium and the living lab approach, the project is not just a technological project. On the contrary, it follows a very socio-economic approach. International (also beyond the EU) cooperation is implicitly addressed, because many of the SME's (especially farm technology companies) operate globally.

Tools for policy makers and other actors to support implementation of relevant strategies, policies and legislation

The platform (WP3), which will be filled with concrete tools for standards development (WP4), will be an important instrument for different stakeholders to implement their strategies and policies. By taking into account several legislative and directive topics (e.g. INSPIRE, PSI, ISO, OGC W3C, OASIS, etc.), the project results will contribute to the appropriate use of them and increase the support. Results from the EU analysis in WP2 provide concrete foundations on which to start with implementing certain strategies, policies or legislation - or to identify what issues have to be solved in advance before implementation.

In the EU, all Member States pay attention to the complexity of CAP management since European farmers are complaining about administrative burden ('red tape'). Standardization and harmonization will help the responsible administrations (Agricultural, Environment) to limit this overload since they will know what is the information collected and will be able to base e.g. evaluation criteria for cross compliance on this well defined collected information. If new legislation is introduced, the agrIXchange platform can be an important factor to guarantee that data collection will not be costly, especially for the farmers themselves.

A standardized system for electronic data exchange offers new possibilities for information-directed agricultural production increasing sustainability and keeping adversary effects to the environment at a minimum. By allowing for an integrated view of farm production data and other data like e.g. climate or geographic data, measures can be adapted to different conditions, optionally leveraging algorithms or expert systems provided by third parties. Using the developed technologies in the future, process quality can be enhanced, leading to higher quality goods and decreasing negative impact on the environment to a minimum. Albert and Hayes (2005) have noted – albeit for another domain – that open exchange of information in a network, where parties publish local data like e.g. sensor data for others to read and use, leads to larger scale shared situation awareness. In the agricultural context, this can for example mean, that threats to production like pests can be earlier recognized and reacted upon.

B.3.1.2 Specific contribution to expected impacts in call and required steps to bring about impacts

In the specific call (KBBE-2009-1-4-03) for this project it is expected that the project by networking and sharing of data handling tools will lead to efficiency gains and cost reductions in the European farming sector.

In section B.1.1.1.2, the problems resulting from poor standardization were listed and are repeated here:

- the choice of components (hardware or software) for farmers is often limited because data exchange is difficult or impossible;
- increase in costs because of double investments in system components with different interfaces;
- the effort for collecting, converting and exchanging necessary data is large, while the possibility for making errors is high;
- it is difficult to integrate (farm-specific) data and knowledge that is locked up in scientific (simulation) models
- decision-support is sub-optimal and as a consequence also decision-making;
- transparency and accountability requirements often lead to administrative burdens.

First, in WP2, these problems are investigated in-depth in different European countries creating a basic awareness among different stakeholders. Then, in WP3, the platform is used to share these problems. Virtual contact between stakeholders is supported by physical contact during the workshops organized by WP6. In WP4, a framework is developed in interaction with various stakeholders (living lab approach), integrating existing standards and methods that help to solve these problems. To support practical use of the framework, several representative use cases are implemented resulting in clear guidelines for different situations. Defining the SRA in WP5 in conjunction with the Advisory Committee, the results are embedded in a long-term vision and development. In this way, it is expected that this project will contribute to efficiency gains and cost reduction in the European farming sector.

B.3.1.3 Why is a European approach necessary?

There are two main reasons why an approach at a European level is necessary. First, it was indicated that agriculture and food production increasingly take place at an international level. Different nodes in one food supply chain can be located in different countries while information sharing within one and the same chain is important. Technology providers, delivering systems that should enable information sharing also operate at an international level. Secondly, it was indicated that harmonization of agricultural standards is a complex problem that each member state is faced with, while solutions should be generic. It would be a waste of money if every country has to re-invent the same wheel. As detailed in section B.1.1.5, there are currently separate initiatives to harmonize aspects of agricultural data exchange in a number of member states (notably France, Germany and The Netherlands). These initiatives are largely national-focussed and currently have produced exchange formats which are not compatible with each other. The work planned in this project will help to form an international network which will allow the alignment of these existing initiatives as they evolve, leading to a high degree of harmonization between standards in use in all member states in the future. It will also provide a competitive advantage to the European region because it will foster good management practice and will allow effective benchmarking.

B.3.1.4 Risk management - external factors that can hamper achieving expected impacts

In the future, there might be several external developments that cannot or hardly be influenced by the project, but may hamper the achievement of the expected impacts. Table 7 lists these possible risk factors, indicates what the possible effect on the expected impacts can be and what measures are taken in the project. Internal risk factors were already provided in section B.1.2.5.

Table 7 External risk factors, the possible effects and measures that are taken

nr.	risk factor	impact	effect	measure
1.	current state-of-the-art in EU countries is very heterogeneous	high	- difficult to work on harmonization because situations are too different	- more emphasis in WP4 and WP5 on defining growth paths towards standardization from different maturity levels - more emphasis on using experience from countries in which standardization is more developed
2.	standardization remains too technology-driven instead of demand-driven	high	- standards will not sufficiently meet requirements from agri-food - problems are not sufficiently solved	- emphasis on business process modelling approach in WP4 - living lab approach in WP4 in which end users are involved - involve people from agri-food business in dissemination activities
3.	poor or no adoption of results by relevant bodies (e.g. UN/CEFTACT, EDI associations)	high	- project results will hardly be adopted by practice - expected impacts are hardly reached	- involve relevant bodies in advisory committee and workshops - representatives of project attend meetings of these bodies
4.	rapid changes in agri-food sector	medium	- difficult to keep standardization in pace	- dynamic reference process modelling that is suitable for dynamic situations; - international harmonization approach so that modifications at a national level is kept to a minimum - take changes into account in setting the SRA in WP5
5.	temporary, general economic recession	medium	- low investments in long-term investments such as standardization - technology and agricultural companies less willing to participate or be involved	- more emphasis on communication and stakeholder integration - indicate the return on investments of standardization

At the start of the project this list will be discussed and modified/extended when necessary. It will also play an important role during meetings with the advisory committee.

B.3.2 Spreading excellence, exploiting results, disseminating knowledge

Basically, stakeholder engagement is a major critical success factor for this project. As identified in the project objectives developers of tools (hard- and software) are the primary addressees of the project. However, in the end, the tools must satisfy the needs of their users, *i.e.* people working in agri-food production (farmers, advisors, etc.). Hence, they also should be involved and engaged. This is reached by applying the 'Living Lab' approach that was described in section B.1.1.4). Standardization, or harmonization of standards, that is not supported by the stakeholders is of no use. Hence, the whole project plan is setup towards this goal and guarantees a strong stakeholder interaction.
The first important moment for stakeholder interaction is in WP2, where all member states are involved through contact persons. We will use the good network of contacts that each individual consortium partner has. With the strong involvement of EFITA, the European umbrella organization for ICT in Agriculture, Food and the Environment, it will be possible to include a broader involvement of the related sector. The inclusion of stakeholders at the different WP stages will permit a critical evaluation of whether the platform and framework address the needs of the agri-food and ICT sector as perceived by stakeholders, and thereby make it more likely that stakeholders will contribute actively to the process of supplying the necessary data that will be needed for any evaluation. The agriXchange platform will be open to the public.

Because stakeholder integration and dissemination is so important for this project, it was decided that these activities should be coordinated from a separate work package (WP6). Again, EFITA plays an important role in this work package. A series of international workshops form the backbone of this work package. The workshops will be open to the public and relevant key players will specifically be invited.
The strategic research agenda (SRA) will be established by interaction with stakeholders. It will be published through the website and the networks of the partners and people that were being involved during the project (platform communities, workshops, advisory committee, etc.). Additionally, the SRA and also other preliminary project results will be presented at relevant national and international forums. Scientific researchers from the project consortium will use the results to communicate to the scientific community through journal and conference papers.

B.4 Ethical Issues

From the proposal's ethical screening, it was considered that it was lacking important information regarding ethics related to the privacy issue. This section describes the particular questions around this issue and our reply.

1. *It is unclear if personal identifiable data will be obtained during the case studies. If such data are obtained, national authorizations or notifications (if applicable) must be provided.*
   Our reply: We understand that this concerns the case studies that are used in WP4 to develop and test the reference framework, which are described in more detail in annex II of the proposal. We don't expect that personal identifiable data will be used for this activity. The reference framework only involves metadata, *i.e.* how data in specific systems should be defined and structured. The idea of the reference framework is that the national systems that are involved, will comply with the reference framework in the future. Indeed, in these national systems personal data are involved, but they will not be used at the level of this project. It can be expected that for demonstration purposes personal identifiable data is involved. In that case, we will take care of anonimisation of the data.

2. *The development of this electronic management system should reflect the needs for handling personal identifiable data in its future application.*
   Our reply: In line with the previous point is that the system that is expected to be actively used after the project still functions as a reference framework that in itself does not manage actual data. Data management is handled by implemented systems (e.g. advisory services, governmental data collection applications) that only refer the framework. The implemented systems are subject to national and European laws on privacy. Nevertheless, we will take this point into consideration in Task 3.4 and WP5 of the project, which deal with future use of the results.

The conclusion is that we stick to our assessment that no processing of personal identifiable data is involved in this project.

B.5 Consideration of gender aspects

ICT is still a relatively male dominated field of work. However, the partners in the agriXchange project acknowledge the added value of the involvement of both genders. Whenever possible, partners will therefore try to involve more women in the project.

The partners appreciate the importance of a more balanced participation of the women in our project as prescribed in the work program and have strived to include as many women as possible in the initial consortium. These include:

- Monique Buijtendorp (administrative coördinator)
- Liisa Pesonen (WP leader)
- Sirpa Thessler (P4)
- Béatrice Balvay (P6)
- Cécile Dos (P6)
- Bénédicte Fusai (P6)
- Marta Terré (P7)
- Anne Geoghegan (P8)
- Janina Rudowicz (P12)
- Sylvie Masselin-Silvin (P13)
- Renate Writzl (P14)

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ANNEX I List of existing use cases

This annex provides a preliminary list of use cases that are strongly related to the subject of this project. The list deals with use cases in which different consortium partners are already involved. It will serve as a first input to the contents of the intended platform in WP3. From there, it can be further extended and detailed.

Germany

Name	Description	Country	State
Hail Insurance	To properly distribute risks among the community of insurance takers, companies offering that service require the farmer to send information about the cultivations on his fields every year. For farmers using farm management information systems, the necessary data is mostly already recorded in electronic form. Thus, it is reused to generate an electronic document, which can be transferred to the hail insurances.	Germany	Ready for production
Machinery Cooperative	Lots of farmers let machinery cooperatives do tillage, harvesting or other work procedures on their fields, as the large machines necessary are often too expensive for a single farmer. Ordering the work involves telling the contractor what to do when an where, optionally with additional parameters such as e. g. preferred pesticide or method of harvesting. Using electronic means can facilitate this process. The cooperative can in turn deliver documentation of the work in electronic form as well, so that target-performance-comparison can easily be accomplished.	Germany	Ready for production
Agricultural Extension by ISIP	There is a growing number of electronic tools available to do prognosis in crop development or model risk of infection for certain plant pests. ISIP is a provider of consultation services for agriculture in Germany doing amongst other things prognosis of Phytophtora infection risk in potatoes and crop development in cereals. Electronic documents can be used to feed the service with necessary data.	Germany	Ready for production
Soil Analysis	To come to a soil analysis, several steps have to be taken. First, one or more samples are taken. They are handed on to a laboratory, which – after analysis – can deliver the result to the farmer. Optionally, a recommendation concerning e. g. fertilization takes place. To be able to properly evaluate results, documentation of locations, methods and results is necessary. If done in electronic form, evaluation can be done e. g. by geographic information systems.	Germany	Mostly ready for production
Generation of Management Zones	In order to simplify site-specific farming a farmer should be able to generate ad-hoc management zones based on a wide range of possible data (e.g. interpolated yield maps, digital terrain models, satellite remote sensing, soil maps, etc.). Much of this data can be directly accessed from web-services provided by external agencies, not necessarily from within the agricultural sector. The data	Germany	Mostly ready for production

	processing to identify zones which have similar characteristics is performed by a dynamically orchestrated web-service chain and the calculated zones are returned to the farmer's software for display and further processing.		
Sustainability Assessment	Sustainability of food production is becoming more and more of an issue. Thus, there are different approaches to assessing agricultural practices for different indicators reflecting sustainability. For some of these, there are software tools available to do the calculations. A large number of input parameters can be derived from electronic documentation of measures on the farm.	Germany	Experimental
Documentation for quality assurance and traceability (animals)	A lot of practices on the farm have an influence on product quality. To properly control process quality in the food chain, it can be beneficial, if followers in the chain have access to some of the data from deliverers of the raw material used. In addition, documentation data collected may serve as a proof for good management practices, should a hazard occur. This example use case is mostly concerned with documentation of livestock farming.	Germany	Experimental
Soil testing	In order to plan a soil testing, a farmer will require some spatial information regarding the fields. A contract including the locations of the test sites will then be transferred to a contractor via web services who will then take the samples and perform the analysis. The geo-referenced results of the sampling will then be made available to the farmer via a web service interface.	Germany	Experimental
Total Nitrogen Extraction	In order to plan site-specific nitrogen (N) fertilisation for a field, the farmer wishes to generate a map of site-specific N extraction from the previous crop and overlay this with a map of the site-specific mineral nitrogen in the soil (N_{min}) to calculate the site-specific total required N. The site-specific yield data is retrieved via a web-service interface from an agricultural data warehouse where it has been uploaded by the contractor who carried out the harvesting and the soil data is retrieved from a web-service provided by a soil sampling contractor. The data is processed via a web-service chain and the final recommended total N is returned to the farmer's software for further processing.	Germany	Experimental
IACS application	The integrated administration and control system (IACS) supports the goals of EC agricultural policy by giving financial incentives to the farmers. Exact regulations and the steps required to receive support are defined by the member states. Applications mostly require giving information about cultivations and land use. Electronic forms and usage of existing data can facilitate this process.	Germany	Experimental
Charge traceability	Goal of this use case is to deliver technology, which enables linkage of existing object data using web technologies without replication of information into bulk objects representing charges of agricultural products, like e. g. a charge of pigs going to the slaughterhouse.	Germany	Experimental, Abstract
Data Dictionary Animal Production	There exists a methodology to exchange data between machinery in livestock farming, the ISOagriNet protocol. Along with it comes a data dictionary defining the items and attributes used in data exchange. The system is highly optimized for the environment it is intended to work in, but parts of the data have to be transferred into other environments like e. g. one following web architecture paradigms, so semantic harmonization and offering a solution for aggregating and transforming content is required.	Germany	Abstract

The Netherlands

Name	Description	Country	State
Crisis viewer	When an animal disease crisis threatens, the public needs to know whether special measurements are in effect for their area. With the help of the crisis viewer, people can simply enter their address and find out instantly if their home or businesses fall within a restricted area.	The Netherlands	Operational
Soil Sampling	This use case is about derivation of an optimal soil sampling scheme for agricultural parcel soil sampling and registration of sampling data through mobile applications. It can be extended to an application for sample registration. Soil sampling is especially relevant for cross compliance, e.g. determining localized phosphate content in low phosphate soils to motivate the application of phosphate.	The Netherlands	Ready for production
EDI-circle	Standards for detailed specification of technical details on invoices of suppliers of inputs to farms and processors of agricultural outputs, for electronic forwarding and automatic processing into financial accounts. The web services-based software is in production in LEI and many accountancy firms servicing the agriculture sector. Suppliers and processors forward standardized invoicing data to a central hub that forwards the data to accountants and LEI, under the condition of authorization by the farmer.	The Netherlands	Ready for Production
Automatic documentation of field operations	Automatic location based registration of machine operations in the field and the possibility to exchange raw and derived data with chain partners and governments. Registered data can be used in the framework of product certification, but also (e.g. when the future Galileo system is exploited) to serve as proof of evidence of good farm management practice.	The Netherlands	Mostly ready for production
Geo farmer	A information exchange service between farm management systems and governmental and private partners, based on web services. Exchange of geo information (topo and cadastre maps, orthophotos, parcel, tillage info) and crop product information. The exchange is ISOBUS and OpenGIS compliant.	The Netherlands	Mostly ready for production
Crisis application animal diseases	Derived from the information on "infected" farms, areas are automatically generated where restrictive measures are into effect. The application can also identify relevant information on the location of road blocks and signs and on traffic/transport restrictions in and around these areas.	The Netherlands	Mostly ready for production
Livestock monitoring	Livestock behaviour monitoring using a sensor network and GNSS technology. The system provides the farmer with on-line data stream on livestock behaviour. Relevant knowledge on e.g. livestock health conditions can be derived. The system can thus help the farmer in complying with animal welfare regulation. Information can be relevant for chain partners in the framework of e.g. certification	The Netherlands	Experimental
Geo fertilizing	Define the e-information exchange messages to support the collection and exchange of relevant information, in order to produce a dedicated advice about artificial fertiliser application, including the equipment instructions for the actual application – distribution of the fertilizer on the field.	The Netherlands	Experimental

Pesticide information management	Automation of the complex process to determine the pesticide to be used in arable farming. Production of a dedicated advice, based on information collected via web services from several databases and decision rules in which restrictions are incorporated. Development of an architecture for the process of information exchange, and messages and web services, including a web service that provides central access to the national pesticide database	The Netherlands	Experimental
Green House Gas effects within horticultural network chains	A software calculation tool to determine Green House Gas production of the whole horticultural production chain and the separate parties in it. Gathering of information and knowledge to do calculations and simulations to get insight into the sustainability of production processes and companies, for optimization and to develop a (certification) standard for Green House Gas emissions.	The Netherlands	Experimental
XBRL/Agro extension	LEI is working with the Dutch ministry of agriculture, Dutch XBRL taxonomy project and multiple accountancy firms on extension of the Dutch XBRL taxonomy for financial reporting. XBRL standard taxonomies are currently operational for reporting to tax services, central statistics, and chambers of commerce. The Agro extensions are being developed as an extension to the Dutch XBRL/Banking taxonomy (currently ready for production), that aims to provide data for credit and other financing applications. The Agro extension will be based on the FADN Farm Return specifications as issued by DG-Agri.	The Netherlands	Abstract
Reference process model agri-food supply chains	It is widely recognized that business processes should be leading in data exchange. This use case designs a generic process model for control and coordination of agri-food supply chains. It is based on the Supply Chain Operations Reference (SCOR) model and is being applied in different agri-food sectors including fruit, potted plants and arable farming	The Netherlands	Experimental

France

Name	Description	Country	State
VSE	For data exchange in relation with animal registration, a national standard has been established and is maintained which consists of 40 messages from 300 data elements which is used for about 50 millions messages per year.	France	Operational
Milking robot	In this project, software has been designed that allows electronic data exchange between milking robots and relevant information systems.	France	Operational
Animal breeding	In order to facilitate electronic data exchange between breeding organisations and between breeding organisations and farmers, standards have been designed and maintained for performance recording and artificial insemination organisations	France	Operational
Animal data dictionary	A shared data dictionary as well as a data model used for data exchange has been established and maintained in order to facilitate data exchange as well as database design	France	Operational
Lab analysis (milk and soil)	In order to plan site-specific nitrogen (N) fertilisation for a field, the farmer wishes to generate a map of site-specific N extraction from the previous crop and overlay this with a map of the site-	France	Ready for production

	specific mineral nitrogen in the soil (Nmin) to calculate the site-specific total required N. The site-specific yield data is retrieved via a web-service interface from an agricultural data warehouse where it has been uploaded by the contractor who carried out the harvesting and the soil data is retrieved from a web-service provided by a soil sampling contractor. The data is processed via a web-service chain and the final recommended total N is returned to the farmer's software for further processing.		
Information Exchange authorisation	Farm information is often managed by third parties such as banks, agricultural advisory services, external accounting offices, administrations. In some cases, direct information transfer from one of these parties to another one is interesting to avoid redundant data input, but this transfer must be authorised by farmers themselves who are the real information owners. This authorisation can not be permanent or "by default". It is an explicit and annual authorisation that the farmers have to confirm. This is the reason why e.g. French agricultural accounting centres are developing an XML information exchange authorisation message.	France	Mostly ready for production
Electronic identification	The implementation of electronic animal identification requires many changes in data exchange systems. The project results in standards between readers and information systems.	France	Mostly ready for production
Agro-environmental traceability	In order to simplify site-specific farming a farmer should be able to generate ad-hoc management zones based on a wide range of possible data (e.g. interpolated yield maps, digital terrain models, satellite remote sensing, soil maps, etc.). Much of this data can be directly accessed from web-services provided by external agencies, not necessarily from within the agricultural sector. The data processing to identify zones which have similar characteristics is performed by a dynamically orchestrated web-service chain and the calculated zones are returned to the farmer's software for display further processing.	France	Abstract
GIEA	In this project contributions from livestock industry to the national information model have been gathered. The model will be the basis of the new French system of electronic data exchange in Agriculture.	France	Abstract

Finland

Name	Description	Country	State
Soilweather	The SOILWEATHER platform provides spatially and temporally accurate information on local weather, soil and growth moisture and water quality. This detailed information is employed in real-time, all-year-round monitoring of the environment, in assessing influences of agricultural practices and water protection activities on nutrient load to water system as well as in developing hydrological and leaching models. The agricultural applications include plant disease forecasts and alerting systems, e.g. alerting producers on drought, frost or moisture conditions predisposing to plant diseases.	Finland	Mostly ready for production
CropInfra	CropInfra - *Production and information management infrastructure for the future crop production*	Finland	Experimental

	farm employs modern ICT to create the technical infrastructure for information management in crop production. The infrastructure serves also management of environmental and traceability information. The "basic infrastructure" includes the data collection from sensor networks and mobile work units as well as the Internet based database server. The basic infrastructure will be developed further to answer the information management demands of a crop production farm in a user centred manner. Internet database server, data transfer and acquisition (documentation), intelligent automatic data handling and safe machine commanding are the themes on the development focus. Use-cases from real farms and research projects are utilised to determine the requirements and details of the future farm's infrastructure and support the technical solutions. Use-cases tested in the platform are ISOBUS compatible intelligent precision sprayer and combined drill, combine harvesting and fertilizer spreading, calculation of site-specific nutrient (NP) balances.		
Carbon label	Extracting information from the field process data (CropInfra) to calculate accurate carbon balances for the marketing purposes of agricultural products.	Finland	Experimental
On-line updating of VRA fertilizing task	When to the work unit (tractor-fertilizer) downloaded VRA task has to be changed during the fieldwork (e.g. nutrient content and NP ratio of the manure appears to be different than planned) the farmer/driver needs to update the plan to meet the compliance to standards. The procedure and data handling methods using internet database server is demonstrated.	Finland	Experimental
Remowel	Collecting information on animal health and welfare status with wireless implantable technology. Remote monitoring of production animals based on long term registration of physiological and behavioural parameters. Setting up the monitoring system and modelling the data achieved from it. Aiming to intensify management solutions and preventive methods on animal health observations in large herds by using new technological solutions.	Finland	Experimental

International

Name	**Description**	**Country**	**State**
Electronic animal identification	Standards for data exchange between transponders and readers regarding electronic animal identification have been proposed to the ISO. This proposal has become a ISO DIS (Draft International Standard).	International	Ready for production
Documentation for quality assurance and traceability (plants)	A lot of practices on the farm have an influence on product quality. To properly control process quality in the food chain, it can be beneficial, if followers in the chain have access to some of the data from deliverers of the raw material used. In addition, documentation data collected may serve as a proof for good management practices, should a hazard occur. This example use case is mostly concerned with documentation of plant production and plays a role also for cross compliance.	Germany Austria	Mostly ready for production
FieldFact Low End Demonstrator: Parcel and management zone measurement	Agricultural parcels and management zones can be measured and registered in a farm management system by farmers, using PDA/smartphone, GNSS and mobile technologies. OpenGIS standards are used for exchange and visualisation of spatial objects. Measured parcels can be internally used (e.g. precision farming) and exchanged with relevant	European context	Mostly ready for production

	parties e.g. for the purpose of CAP related processes. Management zones can be defined and overlayed with existing data sources, like parcel data. Can e.g. be used to include cross compliance related measures (birds nests, non-spraying zones etc.) into precision farming.		
FieldFact Low End Demonstrator: LPIS maintenance	Updating of LPIS data using PDA/smartphone, GNSS and mobile technologies. OpenGIS standards are used for exchange and visualisation of spatial objects. This application provides controllers with the tools to control and maintain LPIS spatial data in the field. Updates can be transferred to an LPIS information system. Relevant for improvement of CAP related processes and for quality control on LPIS data.	European context	Experimental
FieldFact High End Demonstrator: Variable Rate Application	A VRA application map is generated using various on farm and external data sources (measured parcels, management zones, biomass maps etc.). Satellite image based biomass maps, provided through open standards are consumed by a Farm Management System and seamlessly integrated with other on-farm and external data sources to produce application maps for precision farming. This use case shows how data sources from different providers can be seamlessly integrated into the farm management cycle, if (open) standards like OpenGIS are used for data exchange and GIS as part of the farm management system.	European context	Experimental
Animal registration	Electronic Animal registration and identification service. A multi channel service (including web services) is available for the national livestock registration For EU intra-trade electronic information exchange is not available. In CEN a workgroup is working on a standard for electronic exchange of animal identification and registration information. The basic framework of the standard is ready. The project is about to implement a pilot project for the e-exchange of exported cattle (intra trade) between NL, DE and FR.	The Netherlands, Germany, France	Experimental
LPIS quality	All LPIS systems in EU are suffering problems with quality, parameters and definitions. The objective of the program is to define a framework for quality aspects of the LPIS systems. The uses case LPIS quality can be a pilot for describing the quality of all other geo data, to be produced and exchanged in the agro – food domain	The Netherlands and others	Abstract

State Descriptions

Operational:
The results of the use case have been adopted by the agricultural sector and are implemented into a operational production application.

Ready for production:
The use case has been properly analysed and requirements have been fixed and documented in a data model or document definition. This in turn has been used by an agricultural software provider to build some software and test. The technology as such is considered to be ready for adoption by the community of agricultural software suppliers in the respective country and can or has already been made available to them.

Mostly ready for production:
The use case has been properly analysed and requirements have been fixed and documented in a data model or document definition, that is perhaps not yet covering all aspects of the use case. But large parts of it (certain process steps, documents or messages) are complete and can already be made available to be implemented and tested by agricultural software providers.

Experimental:
The use case has been analysed, but perhaps not exhaustively. A draft data model or document definition exists and has either already been contributed in research projects or can be made available publicly for discussion.

Abstract:
The use case is not a real use case in the sense that there are actors to actually exchange data for a single, certain purpose, but rather an important data modelling task delivering a generic model to be used in several processes or use cases.

ANNEX II Description of use cases that are used to develop and test the framework in WP4

In this annex, a more extensive description is provided of the uses cases that are used in WP4. Three use cases are used to develop the framework:

- Updating of LPIS (Land Parcel Identification System)
- 'Geo-farmer' and fertilizing
- Animal registration

These use cases were carefully chosen. The idea is that they are representative for several dimensions and aspects: legislation, spatial data, farm management and tracking & tracing.
Another use case was chosen to verify the framework that will be developed:

- Animal identification

The use cases will be developed within a living lab approach which means that development takes place in a real practical environment and the outcomes should be directly applicable.

Updating of LPIS (Land Parcel Identification System)
EU member states are expected to establish and maintain Land Parcel Identification System (LPIS) as the spatial part of Integrated Administration and Control System (IACS). Member states have set up to different LPIS, which have no standardized structure. The LPIS is seen often as suitable and efficient data source for agricultural and environmental applications where field parcel boundaries are needed in electronic form.
In this use-case, farmer collects data spatial data of her/his new field parcel boundary lines. The farmer sends data to LPIS service provider for updating the parcel boundary lines in the national LPIS. The national LPIS provider does the update to the system and prepares the further data delivery between different LPIS and parcel information utilising agricultural service or software application, accounting for the criteria of INSPIRE. Special attention is paid to the quality representation and assurance of exchanged data; proven data acquisition and data handling processes, content of metadata.

'Geo-farmer' and fertilizing
New automation, ICT and GIS technologies provide solutions for steering and controlling site-specific production systems to fulfil requirements of safe, efficient, environment friendly and traceable production. Good quality and ease of efficient performance of work tasks require, however, organizing a user-centric on-line support for task planning, execution and documentation. The required information management systems can be seen as distributed systems leaning on efficient data exchange between the participating systems. "Geo-farmer" system supports the farmer in his use of all kind of spatial data on his own computer and farm information system. "Geo-farmer" system utilises spatial information produced by the government and business. The exchanged information include the download of geo reference information like topographic maps, orthophotos, and farmers data like retrieving spatial and parcel information out of the parcel register and uploading updates or new parcel information. As a result, the "Geo Farmer" user has updated Farm management information system and parcel register of the ministry of agriculture. The "Geo-farmer" service system allows the reuse of the components for other information exchange processes between third parties for all agricultural practices, including spatial information and other data types.

In this use-case, a German farmer, who uses a Czech farm management system, requests a site specific fertilizer advice, for a specific field. Field ID and boundary information is retrieved from the national LPIS. The advice service is based on a French knowledge-based advice module and it uses satellite data (LAI map) from a Dutch service provider, soil analysis data from the local soil laboratory and "FutureFarm" compliance to standards check functionalities to produce a to standards compliant fertilizer map in ISO 11783 format for the task file needed in fertilizer application. The executed fertilizer application is documented to the farm management information system, where the information is transferred to government's database in connection of administrative reporting.

Animal registration

All EU member states are registering animals on an individual basis in electronic databases. These databases are based on EU regulations. In most member states the animal holder (mostly the farmer or the slaughterhouse) can use an electronic message to update the status of the animal in the database. The exchange of animal identification information is only standardized on national level, but not EU wide. Each member state has his own system, with different check digits and different types of barcodes on eartags and paper passport. For the international movements of animals the cross border information exchange is only done by paper documents. At present, a CEN EEG 14 workgroup is developing an electronic message to support the automatic information exchange in the field of international animal movements. In this use-case, an animal is transported from a farm in one EU country to another for growing, and to a third country for slaughter. In connection to every movement the animal registers are updated in both delivering and receiving countries.

Animal identification

The identification devices could be able to communicate with other farm equipment. Some of the device specifications are itemised by an ISO standard, most are not. For interoperability between livestock identification devices a proper standard is required, and need to be supported by all animal farm device interfaces and the additional electronic information standards, like ISOagriNET and ISOBUS. For instance, the interoperability of EU – national identification devices like yellow ear tags and bolus devices and the animal recognition devices on milking robots, animal feeding devices or animal ID readers on transport equipment or slaughterhouse's entry gates.

In this use-case, the efficiency of the meat production is improved by using animal-specific production information collected from farm process devices, equipment and systems (like feeding, water consumption, air conditioning, animal scale) and slaughter houses (carcass scales and scanners). The information is also used for tracing the market brand information of the meat. The status of the slaughtered animal is updated in the animal register database based on identification information received from the slaughter house.

ANNEX III Supporting Partners

There are two supporting partners that will be involved in the project in project meetings and workshops, but who are no official partners and therefore not responsible for the project results. This mainly has a historical background as they were already always involved in meetings on the subject of agricultural information exchange. However, they are not interested in official participation, because they are governmental bodies, which are excluded by law from getting subsidies in EU-FP7. It concerns:

- Department of Agriculture Nature and Food safety, National Service for the implementing of regulations, The Netherlands
- Department of Agriculture, France

Supporting Partner 1 Department of Agriculture Nature and Food safety, National Service for the implementing of regulations (MINLNV), The Hague (NL)

Expertise of organisation:
The department of Agriculture Nature and Food safety is the national department responsible for policies for agriculture nature and food safety. It develops the legal famework for these subjects, implements the EU legislation into the national legislation. For the execution, maintaining and inspection of agriculture, nature and food regulation there are separate public agencies, who are commited to one or more of these three main tasks. The NSIR is the departments agency for implementing regulations. The NSIR excecutes the EU CAP regulations. The NSIR is the national paying office. One of the objectives of the department is to reduce the costs of the administrative burden. The policy of the depart ment and her agencies to reduce the administrative costs is by moving from paper communication towards a full100 % electronic communication with his partners. To accomplish this 100 % electronic communication a program is started to develop a single window for all departmental services (het LNV-Loket), to set up interactive web pages which can be used for transactions, and to set up web services based on SOA. The leading issues are the interoperability of the departments information systems with the private information systems and the interoperability between the different private systems. To achieve this interoperability there is a big need to use (international) standards for data definitions, to use harmonized data definitions and to use standard message protocols. Because of the lack of these standards, the department and her agencies are participation in and promoting the development of the required standards. By this the department participates in the UN/CEFACT and CEN workgroups, participates in the national standard organizations and strongly support the AgriXchange initiative.
Scientific team (position, main roles and individual expertise):
Ing. Frans van Diepen studied landuse, soil and water management at the Larenstein Institute in Velp (the Net herlands) and additionally information technology (AMBI II). He is a researcher and project manager with 25 years experience in ICT and landuse planning, nature regeneration programs, hydrology modeling and practice of GIS. As manager ICT he was responsible for the ICT development of the national LPIS. At present he is coordinator for the department of agriculture for development and implementing of standards for electronic information exchange in the agro food branch. He participates in the redesign of the national agricultural landuse registration dbase, in technical groups of the national information exchange system for basic registrations, and is project manager for the implementation of Inspire at the NSIR. He is co chair of the UN/CEFACT TBG18 and the CEN ISS EEG14/TBG18 agriculture groups. He is project manager of the UN/CEFACT and CEN project cattle registration information exchange. (harmonisation of data dictionary and messages in cattle and dairy farming). **Ing. Salo de Feijter** studied agricultural business management at the Van Hall Institute in Leeuwarden (The Netherlands). As from 2000 till 2003 he worked for ICT company, mainly developing an online farm management system. And from 2003 till now he works for the Ministry for Agriculture, Nature and Food Quality at the NSIR (National Service for the Implementation of Regulations) as project manager. His main work experience is in de area where agricultural practice meets ICT solutions. He managed projects like creating the website for application single payment scheme, Geo-Farmer and other web-based geo-editing application for farmers.

Annex IV European Federation for ICT in Agriculture, Food and the Environment (EFITA)

Expertise of organization:

EFITA is an autonomous, non-political, non-profit making organization and is the coordinating body and catalyst of its National Member Organizations (NMOs). EFITA seeks to achieve a high reputation and visibility based on the strength of its co-operation with its National Member Organizations. Currently EFITA has 16 NMOs across all over Europe (see www.efita.net). It is at the leading edge of Information and Communications Technology (ICT) developments and the application of ICT in agriculture. EFITA's mission is to facilitate the exchange of information and experience and the promotion and development of knowledge in the area of ICT in agriculture in order to enhance the competitiveness of Europe and to promote the awareness of ICT in agriculture, food and environment. To accomplish these missions EFITA seeks to:

- enrich the activities and harmonize the efforts of its national member organizations and all working units;
- initiate, propose, participate in and contribute to new activities and projects;
- initiate, participate in and contribute to projects at European level;
- organize international Congresses, Seminars and Forums;
- promote the publication of papers, reports and recommendations;
- initiate and maintain contacts with other organizations on an international level.

EFITA currently participates in the EU funded C@R project and its main contributions are in the area of policy discussions and project dissemination. EFITA, as an international federation, is able to support the dissemination of knowledge across Europe and also comment on the impact of policies, for example, the Valencia Declaration and the Prague declaration. It also organizes e-rural conferences (e.g. Brussels 2005). EFITA involves its members in all European countries in this work and, at the same time, also supports international cooperation.

Role in this project

In agriXchange EFITA's role is mainly represented by P13 (Acta Informatique) in WP6 'Stakeholder Integration and Dissemination'. Acta Informatique is maintaining the EFITA newsletter and website and therefore in the right position to do this task on behalf of EFITA

Scientific team:

There are several persons in the agriXchange project that play a key role in EFITA:

- Guy Waksman (P13): publishes the EFITA newsletter and maintains EFITA website
- Sjaak Wolfert (P1): current President
- Karel Charvat (P5): board member and former President
- Jerzy Weres (P12): board member

ANNEX V Subcontractors

As indicated in section B.2.3.4, there are three subcontractors involved in the project:

- PULS is subcontracting Krakow University
- WRLS is subcontracting Lesprojekt Sluzby s.r.o. and HSRS

A brief summary of these subcontractors is provide below.

Krakow University
Agricultural University in Krakow, a state institution of high education, offers education in 12 major fields of study and 28 specialisations. At present it educates about 13,000 students at 7 faculties and Interfaculty Study of Biotechnology and offer full time Master, part-time (weekend) Bachelor programmes, supplementary Master, doctoral (PhD) and post-graduate studies.
Department of Agricultural Engineering and Informatics of the Faculty of Production Engineering and Power Energy play the leading role in developing advanced ICT infrastructure for the agriculture. Major research areas are concentrated on the renewable energy and ecological aspects of biomass production, and on the computer technologies in food economy. Especially, research activities are focused on developing methods for computer support in analyzing, designing, developing, implementing and managing agricultural systems.
Role: Contribution to analysis for Poland, with respect to elements of the data exchange system for agricultural systems, discussing and reviewing.

Lesprojekt Sluzby s.r.o
www.lesprojekt.cz
Lesprojekt sluzby is a SME that works for more then 17 years in the Czech and European market and offers wide variety of services dealing with the creation of wireless communication, Web technologies, positioning, sensors and their integration with geoinformation systems. Lesprojekt sluzby is member of two Czech Research networks: CCSS and **WirelessInfo**.

Lesprojekt sluzby has expertise in
- wireless communication
- sensors
- Wireless Sensors Network
- GPS application
- Forestry and agriculture consultancy and analysis
- field of GIS
- Internet

Experience in other projects:
- Co-ordinator of take up WirelessInfo IST 1999-21056 (already finished www.wirelessinfo.cz, Mobile GIS solution)
- Co-ordinator of take up Premathmod IST-2000-28177 (www.premathmod.cz)
- Partner of project REGEO
- Member of project Aforo

HSRS

HSRS is an SME that works for more then 12 years in the Czech and European market and offers wide variety of services dealing with the creation of geo-information systems. HSRS is one of two Czech members of Open Geospatial Consortium (OGC). HSRS has also representatives in the INSPIRE drafting team. HSRS is member of two Czech Research networks: CCSS and **WirelessInfo**.

HSRS has large experiences with SDI for agriculture, environment, risk protection and for Urban Planning, it is responsible for Flood protection system of Liberec region, management of system and in some cases also for Web hosting for 20 municipalities HSRS is responsible for Czech national metadata and catalogue system, it cooperate on definition of Czech national INSPIRE profile and also on profile for Urban Planning. It is now responsible also for Urban Planning scenario in Humboldt project. As organization working on Czech CLC (2000, 2006), it has also large expertise in this area.

Realised projects: Map server for the Forest Management Institute Brandys nad Labem , I&CLC2000 – Update of database Corine Land Cover for the Ministry of the Environment of the Czech Republic , Project of European Commission IST-2000-28177 Premathmod (as a partner of this project) , Project of European Commission IST-2000-28177 Wirelessinfo (as a partner of this project), Project of European Commission Davinci Mobile services for veterinarian, Project of European Commission Humbold (GMES and INSPIRE), Realisation of map server for Liberec region, Realisation of map server for Vysocina region, Map server for Znojmo, Kutna Hora, Telc, Koprivnice, Kolin, Trest, Map server for micro-region Hrotovicko, municipalities Kosetice, Senozaty, . SPRAVADAT - Management of geographic information and knowledge, System of transmission document data for actualisation of information system of public administration of surveying and cadastre (GEOPLAN). Fllood protection system of Lierec Region