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Abstract

The report D.1.2.1 analysis focuses on the examples of agriculture knowledge management methods mainly in countries where the testing farms are located. Still, this study compares these systems also with other solutions available in the market. It evaluates the currently used technologies at the agriculture management. The study analyses examples of two basic types of current farm management systems; desktop based and Web based. Part of this study is also the assessment of user satisfaction with the currently used systems. The main problem of existing systems is the lack of interoperability and the complicated exchange of information on farm level.

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1 Introduction

The analysis of currently used knowledge management methods is an important part of the definition of the vision for the farm of the future. The knowledge management systems analysis will help to define the concept of future farm management, based on current experiences from existing solutions and mainly based on farmers' satisfaction. This study analyzes examples of most common solutions, but also trends, which will be used in the farms in the future. So, in this study, information was collected about the majority of common knowledge management systems in the market, and these systems were compared with some innovative trends.

Part of the study is the collection and analysis of information about user satisfaction by current systems and by their requirements. The important goal of the work in this package is to review the systems typically used by farms of different size. Project end-users were asked to fill-out a questionnaire regarding parameters, purposes of use, targets and tasks; status, expected functionality (these are shown in annex 2). The result of this analysis was used for recommendations on general architecture.

2 Knowledge management methods

A modern farm management system offers the potential to fundamentally alter agricultural decision-making. The use of large machinery and hired labour has caused many farmers to think of large fields as the basic management unit. Information technologies permit the modern grower to obtain detailed explicit information at a small scale common to farming practices of earlier times but with considerably more information, enabling them to efficiently manage the land at these finer scales.

The basic principle of modern knowledge management allows for more accurate production management. The whole process requires a big amount of data to be collected; this data enables control of the whole process and also introduces information about the situation outside the farm (economical information). For better understanding, to all this process is necessary to improve access to this data and make analysis of this data. Mathematical and statistical analysis and usage of spatial information retrieved from this data can bring new quality to the whole process of future farming. The real end-users of the technologies are not only farmers and agriculture managers, but also advisors and eventually service organizations. Part of knowledge could also be available for the food industry, market and direct consumers. The limitation of better utilization of knowledge is, unfortunately, their limited effective sharing of knowledge. It is necessary to improve access to these data and the possibility of using new information sources.

The FutureFarm project aims to build a model of a farm management information system (FMIS), which will introduce new knowledge management based on new system architecture. This architecture could be expressed by the formula:



Farm management is usually divided into the following steps:

- Data capturing (soil, crop, yield, costs)
- Data analysis and data processing
- Data access
- Management
- Decision and application
- Data archive

The current systems used in farming could be divided into three basic levels:

Macro level

It includes systems, which guarantee communication with surrounding world. It could include yield forecast, information about prices and their forecast, weather information, but also subsidies information and systems for communication with the government about subsidies.

Farm level

Systems oriented to farm management, including accounting, ERM, logistic, machinery, and other tools managing information for farm as a whole, or managing information up to the level of a single field.

Micro level

Systems focused on decision inside one field; usually these are classical systems focused on precision farming.

The goal of the FutureFarm project is to build an open system, which will be able to manage all levels of incoming information on all levels and will be able to support optimal decision taking by farmers. Such kind of solution has to be able to cover all necessary manipulation with data, which will be able to present this data in the form of useful information and which will support effective methods of knowledge management, which could increase the effectiveness of precision farming.

This system will be universal; it will be able to support:

- Data access
- Data collection by farmers and services companies
- Data analysis
- Advisory services preparing recommendation for farmers
- Effective managing directly by farmers
- Using information by service companies
- Future research on the field of farm management
- Training

This is not possible to realize only on the basis of classical desktop solution, because such solutions are not able to cover all necessary functionality and they are incapable to combine the request of simplicity from the side of farmers and users while maintaining the needed complexity of the system.

2.1 Examples of currently used knowledge management system

The existing systems, which represent some examples of the used systems, were described by using a unified table. The systems were selected randomly as certain representative of different types of software used on market. The objective is not to cover everything that exists; it is to have examples of different systems, which cover all three groups:

- Macro level
- Farm level
- Micro level

The analysis cannot be a full analysis of everything that exists in the market, however it has cover some concrete represents and shows the main trends. It is important to know different examples, when interfaces will be defined to other systems. Future Farm systems need to focus not on replacing existing systems, but to support decision on the basis of existing information and usage of interoperable interfaces. The analysis selected some examples, for example for LPIS there exist systems in all European countries with similar functionalities.

The full analysis of selected platform is in annex 1.

The analysis of existing software or services on the market demonstrates that existing solutions could be divided to two different points of view:

1. On which part of farm management is focused
2. Platform

From point of view of farm management focus we can define:

- Macro level for example LPIS
- Farm level For example Agrocom
- Micro level for example FarmWorks

From point of view of platform there exist few groups of solutions:

- Software packages, usually desktop or PDA, which are focused mainly on support of precision farming. This software is usually produced by producers of Agriculture machinery (SGIS, Farmworks)
- Large deployed software (Desktop), which covers all agriculture production, or important part of agriculture production. Examples: ISAGRI, AGROCOM. LANDATA/EUROSoFT. But into this group belongs also ProGIS solution
- Web based application, with limited focus on specific functionality, like support for LPIS (As example Czech LPIS), or CropLook system for traceability Open Web Services based system combining Web based application with desktop solution, could be partly represented by Prefarm or GGeoSys, but also this system till now does not support all necessary functionality.

2.2 Satisfaction of pilot farms with current knowledge management systems

The questionnaires about currently used systems were send to pilot farms to obtained opinion from farms about their satisfaction with current solutions.

The user requirements analysis demonstrates a need for some way to share selected part of information, in specific conditions. So there is a need to build some collaborative environment, not necessary Web based. The Collaborative Environment (CE) is a new concept in agriculture. The current organisation of the work in agriculture is based on distinct services. At the moment there isn't an open solution that is able to support the collaboration among actors along the whole value added chain. The services required are:

- To support cooperation between farmers, advisors and agriculture service organizations.
- To build new concept of farming consultancy based on collaborative work and sharing of common workplace between farmers, advisers and service organization, when all organization could share selected part of data. The common workplace opens possibilities for service organisation to provide effective sharing of data with farmers and provide better analysis of data. Farmers will have opportunity to use results of analysis trough Internet (using Web services), but also trough mobile equipment directly in the field. Important question is to trust farmers that the

information which will be shared will depend on them and will not be accessible by their competitors, but also by other organizations, which could influence the farm.

The biggest limitation at present is the interoperability; to share information among macro, farm and micro level is very difficult. The focus on interoperability is very important and FutureFarm will offer a fully interoperable solution.

Important aspect for all farmers is data security, which could be in some way limitation for usage of Web technology. Czech experience demonstrates, that it is possible to satisfy farmers and that they are able to accept storage of data in Web environment.

The goal of the FutureFarm knowledge management has to be based on common workspace where decision support tools could be shared and which has to be connected with knowledge management system. The solution has to be secure, there is not clear idea, if the data has to be fully managed on farm side, or if part of data could be managed elsewhere e.g. service organization. This opinion is supported by Czech experience, but experiences from other countries don't demonstrate wiliness for such solution. Important aspect is that partners are generally partly satisfied by used platforms, so the focus needs to be on the possibility to add new functionalities based on the interoperability of existing platforms. This completely changes the so far used solution.

Since, there in the FutureFarm consortium are three (four) partners, which are currently on agriculture market, we find it as important to look in first stage on interoperability among existing systems (ProGIS, AgroCom, Prefarms and WIMEX) and take positive experiences from this systems, that might be included into the FutureFarm concept or directly become external modules for FutureFarm solution. It has to be part of collaboration among WP1, WP3 and WP4 for the rest of the year.

3 Conclusion

The Knowledge management methods analysis of existing software or services on the market demonstrated that existing solution could be divided from two different points of view:

1. On which part of farm management is focused
2. Platform

From point of view of farm management focus we can define:

- Macro level – systems including large area and covering more farms
 - Market analysis - crop forecast, markets needs
 - Traceability systems – production process control
 - Subsidies system – crop production support
 - Weather forecast – area management
- Farm level – systems managing knowledge inside of one farm
 - Economy – cost calculation, investment
 - Crop rotation
 - Decision supporting systems
 - Weather forecast – farm action plan
 - Traceability system
- Micro level – system managing knowledge inside of single fields
 - Data collection and data analysis – Robotics or semi robotics system
 - Soil treatment system – field variable rate application, (ploughing, other tillage)
 - Crop treatment system – field variable rate application. (seedling, crop feeding, crop protection, harvest)
 - Water management – irrigation

From the platform point of view there exist few groups of solutions:

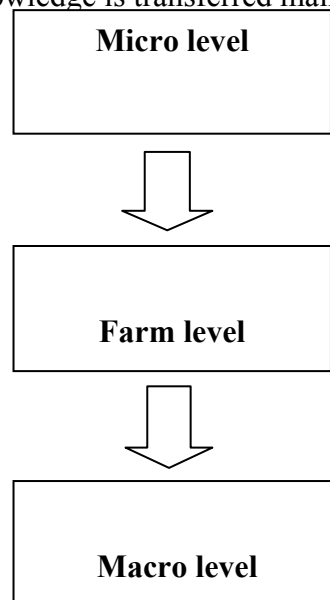
- Software packages, usually desktop or PDA running on machinery or eventually fields systems, which are focused mainly on supporting one rate application or variable rate application (precision farming). This software is usually produced by agricultural machinery producers as an added value of those machines for machines operator use.
- Large deployed software (Desktop), which cover all agriculture production, or important part of agriculture production for farmer use.
- Web based application, with focus on specific functionality, like support for LPIS, or system for traceability or central controlling system
- Open Web Services based system combining Web based application with desktop system, data collection system and field machines management solution.

The Knowledge management user requirements analysis demonstrated needs for some way to share selected part of information, in specific conditions. So there is needed to build some collaborative

environment, not necessary Web based. The Collaborative Environment (CE) is a new concept in agriculture. The current organisation of the work in agriculture is based on distinct services. At the moment there isn't an open solution that is able to support the collaboration among actors along the whole value added chain. The services required are:

- To support cooperation between farmers, advisors (agriculture service organizations, market needs and trends), Universities (Research institutes).
- To build new concept of farming consultancy based on collaborative work and sharing of common workplace between farmers, advisors (agriculture service organizations, market needs and trends), Universities (Research institutes), when all organization could share selected part of data. Collaboration between advisors and Universities (Research institutes) is on different level of collaboration, but research is done on real farm data and result is delivered to farmer through advisors mainly. The common workplace opens possibilities for service organisation to provide effective support and services. Data sharing between farmers and advisor provide better data treatment and analysis of data. Farmers will have opportunity to use results of analysis through Internet (using Web services), but also through mobile equipment directly in the field. Important question is to trust farmers, that the information, which will be shared will depend on them and will not be accessible by their competitors, but also by other organization, which could influence farm.

So far the biggest limitation of agriculture knowledge management systems is interoperability. To share information among macro, farm and micro level is very difficult. Also there is not optimal using of information from different knowledge management levels for decision making. If there exist data sharing (or better data export), knowledge is transferred mainly just in one direction as follows:



As an example it could be mentioned subsidies systems or traceability systems, where information from fields, are transferred on farm level and then used for subsidies controlling or for market information. The previous analysis of this report demonstrates that for future farm knowledge management systems are necessary to change this strategy.

For example next table demonstrate changes in prices of sugar beat in pilot countries¹

Selling prices of sugar beet (unit value) - Prices in EUR per 1000 kg

States/Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Germany				43,03	41,27	41,5					32,86	29,78
Denmark	47,78	45,1	43,19	41,36	47,22	44,42	41,45	50,06	47,85	46,16		
Czech Republic	26,99	23,6	22,05	20,69	23,29	28,59	31,49	29,45	35,25	43,52	36,31	30,97
Greece	55,37	57	40,01	41,99	46,12	42,92	34,75	38,32	45,15	43,85	24,58	22,6

The absolute prices in this table give information on the levels of the producer prices of the product. Prices are net of VAT

It is clear, that changes on the market have and will have critical influences on the farming sector. To be possible to adapt farms on changing situation and to optimise any decision, we need both directional transfer of information and knowledge. We have consider, that from economical point of view, most important decision has to be done on farm level, but we will need for this a lot of information from macro level, which will have most important influence on economy of farm as a whole. Long time sustainability and environment protection will be influenced mainly by micro level. But for different strategies, we will need on micro level also input from farm level.



Due the growing importance of cooperation and more collaboration and needs for knowledge sharing, goal of the FutureFarm knowledge management has to be based on virtual common workspace where selected part of knowledge, but also decision support tools could be shared and which has to be connected with knowledge management system. The solution has to be secure. There are too option. First will be, that the data has to be fully managed on farm side and only selected knowledge will be shared, or if part of data and information could be managed for example service organization. For sharing of parts of data and information, there is necessary guarantee security of transaction but also

¹ http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136206,0_45570467&_dad=portal&_schema=PORTAL

trust all information of single farms, which could have influence on competitiveness of the farm on the market.

4 Annex 1 – A software package per table and its provided functionalities

System name	AGRO-NET/RAMIS
Producer	Agrocom GmbH
Level	Farm, Micro
Which part of production it covered	Crop production & farm management
Basic principle of architecture of solution	Desktop farm management software
Does system supported collaboration	Yes
If yes how	A special version of AGRO-NET is able to import the individual AGRO-NET databases from a group of farmers to create a benchmark

	over several indices like average yield in wheat or average nitrogen consumption in rye.
Does have system inputs from external sources	Yes
If yes, which	<ol style="list-style-type: none"> 1. Import crops, fertilizers, chemicals, costs and plant protection recommendations from advisor over an internet server. 2. Import official field names, sizes, grown crops from data used for EU subsidy application.
Does system outputs into external sources	Yes
If yes which	<ol style="list-style-type: none"> 1. Export field details as part of EU subsidy applications in different formats for each supported EU country and German federal state. 2. Generic documentation export details of crop production details over agroXML.
Does system supported Web communication	Yes
If yes how	Download of individual plant protection recommendation and master data from advisor from an internet based server.
Does system support mobile communication	No
If yes how	
In which countries is system used	Germany, Poland, Hungary, Czech republic, Russia, Ukraine, Latvia
How long is system used	Since 2002
How many user use system	~4000
How many installation of system exist	~4000

How big area is managed by the system	unkown
How easy is integrate other parts into the system	Software integration over DLL and WebServices (SOAP). Data integration over agroXML, ISO XML or CSV spread sheet formats.

System name	AGrar Office
Producer	PC Agrar
Level	Farm, Micro
Which part of production it covered	All production
Basic principle of architecture of solution	PC based MS Windows
Does system supported collaboration	Yes
If yes how	Export and imports into different platforms
Does have system inputs from external sources	Yes
If yes, which	For example John Deer
Does system outputs into external sources	Yes
If yes which	For example John Deer
Does system supported Web communication	Not
If yes how	
Does system support mobile communication	Yes
If yes how	Via GPRS
In which countries is system used	Germany, Poland, Hungary, Czech R.,
How long is system used	From 82
How many user use system	Not exactly known, but more then thousand
How many installation of system exist	Not exactly known, but more then thousand
How big area is managed by the system	Not known
How easy is integrate other parts into the system	AgroXML

System, software, services name	Prefarm
Producer	Help Service Remote Sensing
	Micro, Farm
Which part of production it covered by system, software, services	Crop production, precision farming, traceability
Does the system, software, services support analysis of spatial data	Yes
If yes how	It support Web analysis using Web processing services
Does the system, software, services support decision making?	Yes
If yes how	It support recommendation for precision farming
Does the system, software, services supported collaboration	Yes
If yes how	The Prefarm offer common workspace for communication among farmers, advisory services and service organization
Basic principle of architecture of solution	Web based solution based on Open Service Architecture
Does have the system, software, services inputs from external sources	Yes
If yes, which	It support exchange with some software, like Farmworks or Agchem software on the base of proprietary protocols
Does system, software, services outputs into external sources	Yes
If yes which	It support exchange with some software, like Farmworks or Agchem software on the base

	of proprietary protocols
Does the system, software, services supported Web communication	Yes
If yes how	The solution is Web based application, it supported also OGC WMS services
Does the system, software, services support mobile communication	Yes
If yes how	Downloading data from machinery using GPRS
In which countries is system used	Czech, Slovakia, Ukraine
How long is the system, software, services used	From 2000
How many user use system	200
How many installation of the system, software, services exist	1 as Web system 200 of desktop components
How big area is managed by the system, software, services	300 000 ha
How easy is integrate other parts into the system, software, services	On the base of Web services
Other important aspects of the system, software, services	System is based on OGC standards
Your comments about the system, software, services	System is successfully used, it support mainly advisory service

System, software, services name	ISAGRI
Producer	ISAGRI group
Level	Farm, micro
Which part of production it covered by system, software, services	All agriculture production
Does the system, software, services support analysis of spatial data	Yes
If yes how	Using ISOMAP desktop system
Does the system, software, services support decision making?	Yes
If yes how	There exist set of tools supporting decision in different areas
Does the system, software, services supported collaboration	Yes
If yes how	System support export and imports
Basic principle of architecture of solution	Desktop solution
Does have the system, software, services inputs from external sources	Yes
If yes, which	Exports
Does system, software, services outputs into external sources	Yes
If yes which	
Does the system, software, services supported Web communication	Not known, no information available on Web pages
If yes how	
Does the system, software, services support mobile communication	Yes
If yes how	the system support PDA platform for terrain work

In which countries is system used	Italy, Germany, Switzerland, Spain, Holland and Belgium, and has a distributor in Portugal, America, Africa Asia,
How long is the system, software, services used	From 2000
How many user use system	40 000
How many installation of the system, software, services exist	40 000
How big area is managed by the system, software, services	Not known, no information available on Web pages
How easy is integrate other parts into the system, software, services	Not known, no information available on Web pages
Other important aspects of the system, software, services	One from most often used systems
Your comments about the system, software, services	Important player on the market

System, software, services name	Czech LPIS
Producer	Sitewell
Level	Macro
Which part of production it covered by system, software, services	Subsidies, Controlling system
Does the system, software, services support analysis of spatial data	No
If yes how	
Does the system, software, services support decision making?	No
If yes how	
Does the system, software, services supported collaboration	Not
If yes how	The system support on line edition of information by farmers
Basic principle of architecture of solution	Web based application, but proprietary system
Does have the system, software, services inputs from external sources	Yes
If yes, which	System uses its own inputs
Does system, software, services outputs into external sources	Yes
If yes which	System is able export data
Does the system, software, services supported Web communication	Yes
If yes how	It is Web based application, it supported Web access and Web editing
Does the system, software, services support mobile communication	Not

If yes how	
In which countries is system used	Czech
How long is the system, software, services used	From 2000
How many user use system	All Czech farmers
How many installation of the system, software, services exist	1
How big area is managed by the system, software, services	All Czech farming area
How easy is integrate other parts into the system, software, services	All Czech farming area
Other important aspects of the system, software, services	Based on Autodesk Map Guide, no support for Web services, not metadata, closed system
Your comments about the system, software, services	Not known

System, software, services name	SSToolbox
Producer	SST Development Group, Inc
Level	Micro, Farm
Which part of production it covered by system, software, services	precision farming, crop planning
Does the system, software, services support analysis of spatial data	Yes
If yes how	It supports spatial data processing, application recommendation maps, record keeping, budgeting and crop planning
Does the system, software, services support decision making?	Yes
If yes how	It provides the opportunity to show all orders placed in the farm businesses and have a complete view of the organization's information management program in real-time plus the recommendation maps.
Does the system, software, services supported collaboration	Yes
If yes how	It is also targeted for advisory services to communicate with their farmers-clients
Basic principle of architecture of solution	Desktop, portable, PDA applications. It is a GIS solution.
Does have the system, software, services inputs from external sources	Yes
If yes, which	It supports a wide range of data inputs from external equipment and clients
Does system, software, services outputs into external sources	Yes

If yes which	It supports a wide range of data outputs that could go directly to hardware applicators
Does the system, software, services supported Web communication	Yes
If yes how	With their latest software package, farmers could send their data online, it will be analyzed and the application maps will be back to them, instead of the desktop applications.
Does the system, software, services support mobile communication	Yes
If yes how	Bluetooth communication
In which countries is system used	USA, Canada and 22 other countries
How long is the system, software, services used	Since 1994
How many user use system	Not known
How many installation of the system, software, services exist	Not known
How big area is managed by the system, software, services	Not known
How easy is integrate other parts into the system, software, services	Not known
Other important aspects of the system, software, services	N/A
Your comments about the system, software, services	It covers all the needs for precision agriculture application and record keeping, but it requires some time to get used to the system by yourself, if you are away from the training centers. So, it may be not so easy for individual farmers to use it without training.

System, software, services name	AFS farm software
Producer	Case IH
Level	Micro
Which part of production it covered by system, software, services	Crop production, Variable Rate Application(VRA), traceability
Does the system, software, services support analysis of spatial data	Yes
If yes how	It support analysis using local PC processing service
Does the system, software, services support decision making?	Yes
If yes how	It support recommendation for VRA
Does the system, software, services supported collaboration	Yes
If yes how	The AFS offer common workspace for farmer-end user with other AFS software equipment
Basic principle of architecture of solution	Pc based solution based on ESRI files Architecture
Does have the system, software, services inputs from external sources	Yes
If yes, which	It support data exchange with software based on Esri platform, or on the base of proprietary protocols
Does system, software, services outputs into external sources	Yes
If yes which	It support data exchange (export-import) to Esri shape, Ascii text, BMP, Jpeg, GeoTiff and ect.

Does the system, software, services supported Web communication	No
If yes how	
Does the system, software, services support mobile communication	No
If yes how	
In which countries is system used	USA , some European countries
How long is the system, software, services used	From 1996
How many user use system	Not known
How many installation of the system, software, services exist	Not known
How big area is managed by the system, software, services	Not known
How easy is integrate other parts into the system, software, services	On the CD base
Other important aspects of the system, software, services	System is based on ESRI platform
Your comments about the system, software, services	System is successfully used, it support mainly farmers in yield monitoring, VRA field application,

System, software, services name	AGROffice-DokuPlant
Producer	PROGIS Software GmbH
Level	Farm, Micro
Which part of production it covered by system, software, services	Crop production, documentation for traceability, soil management (nutrient balancing), crop planning, cost calculation, mapping
Does the system, software, services support analysis of spatial data	Yes
If yes how	It supports area identification, defining of the actual cultivated area, splitting and joining plots, creating thematic maps
Does the system, software, services support decision making?	Yes
If yes how	It supports recommendation for crop activity planning. The add on modules supporting decision in soil management (fertilizing, irrigation, spraying), cost management, crop planning
Does the system, software, services supported collaboration	Yes
If yes how	The system offers common workspace for group needs of farmers conducted by advisory services and service organizations and considers the needs of affiliated industries (public and/or private organizations)
Basic principle of architecture of solution	Desktop application
Does have the system, software, services	Yes

inputs from external sources	
If yes, which	Interfaces to GIS data formats (shp, dxf, mif, ascii, csv, ...), image formats (jpeg, tif, ecw, bmp, ...), interface for importing GPS-data, machine data.
Does system, software, services outputs into external sources	Yes
If yes which	Export interfaces to GIS data formats (shp, dxf, mif, ascii, csv, ...), Google-Earth-Export, MR Virtual Earth, GlobalGAP xml-Export, Excel-Export.
Does the system, software, services supported Web communication	No
If yes how	
Does the system, software, services support mobile communication	Yes, Precision Farming order processing with DokuPlant mobJOB
If yes how	Send an activity based job (incl. plot information) via DokuPlant (GPRS/UMTS) to the LoGISTik central.
In which countries is system used	Germany, Slovakia, Austria, Spain, Romania, Bosnia-Herzegovina
How long is the system, software, services used	From 2003
How many user use system	~ 2.000
How many installation of the system, software, services exist	~ 2.000
How big area is managed by the system, software, services	~ 200.000 ha
How easy is integrate other parts into the system, software, services	AGROffice Development KIT enables to modify local reports or forms on customer request and to create new reports (e.g.

	<p>subsidy report, local risk management, special CC-tools and analysis not covered with the standard products) because of customer inquiries. Furthermore you have the possibility to create your own application (e.g. application for risk-management like FOMUMIIS).</p>
<p>Other important aspects of the system, software, services</p>	<p>Admin-Version for adapting and modifying the expert database (agricultural machines and their costs, herbicides, fungicides and their contents and costs, crop and varieties, mineral and organic fertilizers and their contents, yields, seeds, cultivation requirements and all yearly cultivation activities in detail) to their local request.</p> <p>The bottom up approach allows the integration of any future innovations mainly in the fields Precision Farming and Virtual Farming.</p>
<p>Your comments about the system, software, services</p>	<p>System can be used by farmers, group of farmers, farm advisory services, experts and other organizations (bank, financing, etc.). It is part of AGROffice-logistics for order processing in different logistic areas like biomass, sugar beet harvesting.</p>

System, software, services name	PROGIS LoGISTic
Producer	PROGIS Software GmbH
Level	Farm
Which part of production it covered by system, software, services	Crop production, traceability, mapping, tour planning, managing the vehicles
Does the system, software, services support analysis of spatial data	Yes
If yes how	It supports area identification, creating fields, thematic maps, locations of machinery in operation are spatially correct visualised
Does the system, software, services support decision making?	Yes
If yes how	It is supporting decision in tour planning regarding the following work process, cost management, time management, planning management (especially in unpredictably events like vehicle breakdown) and better decisions on employment.
Does the system, software, services supported collaboration	Yes
If yes how	The system offers common workspace for group needs of farmers conducted by advisory services and service organisations and considers the needs of affiliated industries (public and/or private organisations)
Basic principle of architecture of solution	Desktop application
Does have the system, software, services inputs from external sources	Yes
If yes, which	Interface to SQL-DB, interfaces to GIS data

	formats (shp, dxf, mif, ascii, csv, etc.), image formats (jpeg, tif, ecw, bmp, etc.), interface for importing GPS-data, machine data.
Does system, software, services outputs into external sources	Yes
If yes which	Export interfaces to GIS data formats (shp, dxf, mif, ascii, csv, etc.), Google-Earth-Export, MR Virtual Earth, GlobalGAP xml-Export, Excel-Export.
Does the system, software, services supported Web communication	No
If yes how	
Does the system, software, services support mobile communication	Yes. Precision Farming order processing with DokuPlant mobJOB
If yes how	The central and the mobile part are in constant data exchange (GPRS/UMTS). Send an activity based job (incl. plot information) via DokuPlant (GPRS/UMTS) to the LoGISTik central and to the mobile part. After order processing, the done job including several information goes back to DokuPlant (GPRS/UMTS).
In which countries is system used	Germany
How long is the system, software, services used	From 2003
How many user use system	~ 50 central station and ~ 200 mobile stations
How many installation of the system, software, services exist	~ 50 central station and ~ 200 mobile stations
How big area is managed by the system, software, services	~ 40.000 km ²

<p>How easy is integrate other parts into the system, software, services</p>	<p>AGROffice Development KIT enables to modify local reports or forms on customer request and to create new reports (e.g. subsidy report, local risk management, special CC-tools and analysis not covered with the standard products) because of customer inquiries. Furthermore you have the possibility to create your own application (e.g. application for risk-management like FOMUMIIS).</p>
<p>Other important aspects of the system, software, services</p>	<p>The bottom up approach allows the integration of any future innovations mainly in the fields Precision Farming and Virtual Farming.</p>
<p>Your comments about the system, software, services</p>	<p>System can be used by farmers, group of farmers, farm advisory services, machinery cooperatives and other organisations in any logistic areas like biomass, sugar beet harvesting. It is part of AGROffice-DokuPlant for GIS-supported plot specific documentation, cost calculation, soil management (nutrient balance) and traceability.</p>

System, software, services name	Farm Site Mate
Producer	Farm Works
Level	Micro
Which part of production it covered by system, software, services	Crop production, production plans, Variable Rate Application(VRA) and Multi Variable Rate Application, Data conversion from one to other map format, traceability, wireless data transport
Does the system, software, services support analysis of spatial data	Yes
If yes how	It support analysis using local PC processing service
Does the system, software, services support decision making?	Yes
If yes how	It support recommendation for VRA and MVRA of field application
Does the system, software, services supported collaboration	Yes
If yes how	The Farm Site Mate offer common workspace for communication among advisory services and lab services
Basic principle of architecture of solution	Pc based solution based on Arc Info Architecture
Does have the system, software, services inputs from external sources	Yes
If yes, which	It support data exchange with software based on Esri platform, or on the base of proprietary protocols
Does system, software, services outputs	Yes

into external sources	
If yes which	It supports data exchange with software, like Greenstar, Agrocom, LH Agro, SGIS and ect.
Does the system, software, services supported Web communication	Yes
If yes how	Update services
Does the system, software, services support mobile communication	Yes
If yes how	Wireless data transport
In which countries is system used	USA, Europe Union, Russia, Australia...
How long is the system, software, services used	From 1992
How many user use system	More than 20,000 users
How many installation of the system, software, services exist	More than 20,000
How big area is managed by the system, software, services	10 000 000 ha
How easy is integrate other parts into the system, software, services	On the CD base
Other important aspects of the system, software, services	System is based on ESRI platform
Your comments about the system, software, services	System is successfully used, it support mainly advisory service and fertilizer sales with MVRA and VRA field application

System, software, services name	JDOffice
Producer	John Deer
Level	Micro
Which part of production it covered by system, software, services	Crop production, production plans, Variable Rate Application(VRA) , traceability
Does the system, software, services support analysis of spatial data	Yes
If yes how	It support analysis using local PC processing service
Does the system, software, services support decision making?	Yes
If yes how	It support recommendation for VRA
Does the system, software, services supported collaboration	Yes
If yes how	The JDOffice common workspace for communication farmers and services
Basic principle of architecture of solution	Pc based solution
Does have the system, software, services inputs from external sources	Yes
If yes, which	It support data exchange with software based on JDOffice platform
Does system, software, services outputs into external sources	Yes
If yes which	It supports data exchange with software, like Greenstar, Auto track
Does the system, software, services supported Web communication	No

If yes how	
Does the system, software, services support mobile communication	No
If yes how	
In which countries is system used	USA, Europe Union, Russia, Australia...
How long is the system, software, services used	From 1996
How many user use system	Not known
How many installation of the system, software, services exist	Not known
How big area is managed by the system, software, services	Not known
How easy is integrate other parts into the system, software, services	On the CD base
Other important aspects of the system, software, services	System is based on PC
Your comments about the system, software, services	System is successfully used, it support mainly farmers

System, software, services name	Soilection Geographic Information System(SGIS)
Producer	AGCO
Level	Micro
Which part of production it covered by system, software, services	Crop production, Planning, Variable Rate Application(VRA) and Multi Variable Rate Application (MVRA), traceability
Does the system, software, services support analysis of spatial data	Yes
If yes how	It support analysis using local PC processing service
Does the system, software, services support decision making?	Yes
If yes how	It support recommendation for VRA, MVRA, Yield maps, images, Tiff, GeoTiff
Does the system, software, services supported collaboration	Yes
If yes how	The SGIS offer common workspace for farmer-end user with other AFS software equipment
Basic principle of architecture of solution	Pc based solution based on ESRI files Architecture
Does have the system, software, services inputs from external sources	Yes
If yes, which	It support data exchange with software based on Esri platform, or on the base of proprietary protocols
Does system, software, services outputs into external sources	Yes

If yes which	It supports data exchange (export-import) to Esri shape, Ascii text, BMP, Jpeg, GeoTiff and ect.
Does the system, software, services supported Web communication	Yes
If yes how	Software Update
Does the system, software, services support mobile communication	No
If yes how	
In which countries is system used	USA, Europe Union, Australia, South America, Russia.
How long is the system, software, services used	From 1995
How many user use system	More than 10,000 users
How many installation of the system, software, services exist	More than 10,000
How big area is managed by the system, software, services	20 000 000 ha
How easy is integrate other parts into the system, software, services	On the CD base
Other important aspects of the system, software, services	System is based on ESRI platform
Your comments about the system, software, services	System is successfully used, it support mainly service people in MVRA and VRA field application

System, software, services name	FMS AgroSense (client-server-solution)
Producer	Agro-Sat Consulting GmbH
Level	Micro, Farm
Which part of production it covered by system, software, services	Crop production, precision farming, traceability, planning of fertilizers
Does the system, software, services support analysis of spatial data	No
If yes how	
Does the system, software, services support decision making?	Yes
If yes how	Comparison of the production costs for single fruit Calculation of nutrient content in the soil as a function of the plan yield and the planned fertilization information of satellite pictures to evaluate the homogeneity of the fields
Does the system, software, services supported collaboration	Yes
If yes how	The Prefarm offer common workspace for communication among farmers, advisory services and service organisation
Basic principle of architecture of solution	Web based solution based on Open Service Architecture
Does have the system, software, services inputs from external sources	Yes, partial
If yes, which	It support exchange with some other own software (for example for the feed mill

	software) on the base of proprietary protocols
Does system, software, services outputs into external sources	Yes
If yes which	only simple export function to use the data for instance in MS EXCEL
Does the system, software, services supported Web communication	No
If yes how	
Does the system, software, services support mobile communication	No
If yes how	
In which countries is system used	Germany
How long is the system, software, services used	From 2001
How many user use system	50
How many installation of the system, software, services exist	about 30 different users (companies)
How big area is managed by the system, software, services	300 000 ha
How easy is integrate other parts into the system, software, services	On the base of Web services
Other important aspects of the system, software, services	System is based on OGC standards
Your comments about the system, software, services	System is successfully used, it support mainly advisory service

System name	AGRO-NET/RAMIS
Producer	Agrocom GmbH
Level	Farm, Micro
Which part of production it covered	Crop production & farm management
Basic principle of architecture of solution	Desktop farm management software
Does system supported collaboration	Yes
If yes how	A special version of AGRO-NET is able to import the individual AGRO-NET databases from a group of farmers to create a benchmark over several indices like average yield in wheat or average nitrogen consumption in rye.
Does have system inputs from external sources	Yes
If yes, which	<ol style="list-style-type: none"> 3. Import crops, fertilizers, chemicals, costs and plant protection recommendations from advisor over an internet server. 4. Import official field names, sizes, grown crops from data used for EU subsidy application.
Does system outputs into external sources	Yes
If yes which	<ol style="list-style-type: none"> 3. Export field details as part of EU subsidy applications in different formats for each supported EU country and German federal state. 4. Generic documentation export details of crop production details over agroXML.
Does system supported Web	Yes

communication	
If yes how	Download of individual plant protection recommendation and master data from advisor from an internet based server.
Does system support mobile communication	No
If yes how	
In which countries is system used	Germany, Poland, Hungary, Czech republic, Russia, Ukraine, Latvia
How long is system used	Since 2002
How many user use system	~4000
How many installation of system exist	~4000
How big area is managed by the system	unkown
How easy is integrate other parts into the system	Software integration over DLL and WebServices (SOAP). Data integration over agroXML, ISO XML or CSV spread sheet formats.

System, software, services name	FarmSat® - www.farmsat.com
Producer	GEOSYS SA, France
Which part of production it covered by system, software, services	Mapping and recordkeeping for every field, every crop, decision support tools for arable crops
Level	Farm, Micro
Does the system, software, services support analysis of spatial data	Yes
If yes how	Use of aerial photography for field borders delineation; use of remote sensing and soil maps for inputs variable rate application and upload of as-applied map into the recordkeeping. ORACLE spatial database, GDAL maps processing
Does the system, software, services support decision making?	Yes
If yes how	Website has specific pages for decision making (fertilizer, chemicals, etc.) that can be adapted to specific end-user needs
Does the system, software, services supported collaboration	Yes
If yes how	Farmers' data is private but farmers can grant access to a given crop consultant or all the crop consultants of the retail
Basic principle of architecture of solution	Website
Does have the system, software, services inputs from external sources	Yes
If yes, which	Satellite imagery, field borders from third party software & soil analysis maps can be

	uploaded by user.
Does system, software, services outputs into external sources	Yes
If yes which	Any data created in FarmSat® can be exported to Excel, ESRI software, variable rate application controllers, google earth.
Does the system, software, services supported Web communication	Yes
If yes how	It's a website
Does the system, software, services support mobile communication	Yes
If yes how	If laptop uses cell connection (3G)
In which countries is system used	USA, Canada, UK, France, Israël, Argentina
How long is the system, software, services used	5 years
How many user use system	Approx 4000, all using it for precision ag features
How many installation of the system, software, services exist	It's a website, no need for installation
How big area is managed by the system, software, services	2 000 000 has
How easy is integrate other parts into the system, software, services	Integration is done by GEOSYS at customer demand, this requires specific developments
Other important aspects of the system, software, services	Industrial platform for bringing service to growers, with batch functions dedicated to crop consultants, and access can be granted to farmers for use of the recordkeeping features.
Your comments about the system, software, services	Extensive Web geo solution dedicated for farmers and crop consultants use, bringing an

	added-value to farmers due to yield improvement and inputs better use as well as bringing value to crop consultants and retails by allowing bringing new services and better collaboration to farmers
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System, software, services name	CropLook
Producer	Basfood B.V.
Which part of production it covered by system, software, services	Actual crop growth information
Level	Farm, Macro
Does the system, software, services support analysis of spatial data	Yes
If yes how	<p>he SEBAL model has been developed at the University of Wageningen in the Netherlands, by Prof Dr Wim Bastiaanssen. SEBAL stands for Surface Energy Balance Algorithm for Land and is based on the actual intake of CO² and the evaporation H²O of plants. The SEBAL model is accurate per pixel with resolutions down to 10x10 meters. SEBAL is rapidly gaining worldwide recognition through its practical application in a variety of projects, of which the latest is the detailed and accurate measurement of crops in the field. Used by farmers to gain more productivity of a large number of crops. SEBAL is the only model in the world, which provides directly useful quantitative data such as kilograms per hectare or liters per square meter. The model is validated in scientific institutes, through technology assessments and has proven itself in agricultural practice.</p>
Does the system, software, services support decision making?	Yes

If yes how	CropLook give actual information about crops
Does the system, software, services supported collaboration	Yes
If yes how	
Basic principle of architecture of solution	Website
Does have the system, software, services inputs from external sources	Yes
If yes, which	Satellite imagery, field borders from third party software & soil analysis maps can be uploaded by user.
Does system, software, services outputs into external sources	Not known
If yes which	
Does the system, software, services supported Web communication	Yes
If yes how	It's a website
Does the system, software, services support mobile communication	Not
If yes how	
In which countries is system used	The Nederland, France
How long is the system, software, services used	
How many user use system	Not known
How many installation of the system, software, services exist	It's a website, no need for installation
How big area is managed by the system, software, services	
How easy is integrate other parts into the system, software, services	Integration is done at customer demand, this requires specific developments

<p>Other important aspects of the system, software, services</p>	<p>The SEBAL model is developed at the University of Wageningen in the Netherlands, by Prof Dr Bastiaanssen. SEBAL stands for Surface Energy Balance Algorithm for Land and is based on the actual intake of CO² and the evaporation H²O of plants. The SEBAL model is accurate per pixel with resolutions down to 10x10 meters. SEBAL is rapidly gaining worldwide recognition through its practical application in a variety of projects, of which the latest is the detailed and accurate measurement of crops in the field. SEBAL is the only model, which provides directly quantitative data such as kilograms per hectare or liters per square meter.</p>
<p>Your comments about the system, software, services</p>	<p>Extensive Web geo solution dedicated for farmers and crop consultants use, bringing an added-value to farmers due to yield improvement and inputs better use as well as bringing value to crop consultants and retailers by allowing bringing new services and better collaboration to farmers</p>

5 Annex 2 –Questionnaires and answers by the farms

5.1 Mespol

Question		Mespol
Basic software info	Which software do you use in your farm (Please list them and describe them)?	<ul style="list-style-type: none"> a) Prefarm – Denik honu (field notes) – Pc tab software connected to web GIS application via Internet connection for data collection and data using for making decision and feedback for government statistic – focus on crop and animal production – for managers in Crop production b) Prefarm Mapserver c) Ag Info – PC software for parcel statistical overview, mainly used for official statements for government needs and land agreements. – for accouters d) LPIS – web application
	Which is the producer of this software?	<ul style="list-style-type: none"> a) HSRS (WirelessInfo member) b) HSRS (WirelessInfo member) c) Czech Local producer, Ag Info Jičín d) Sitewell s.r.o., under Agriculture department of Czech Republic
	Which part in the production phase does it cover?	<ul style="list-style-type: none"> a) Finance, Decision Making, Evidence, Controlling b) Any raster and vectors maps(polygon, line, point, images) – airborne images, satellite images, field boundary, soil sample control points, as

		<p>applied maps, soil nutrient maps, variable rate application maps, yields maps</p> <p>c) LPIS parcels maps, Soil Properties Maps, Imagery</p> <p>d) LPIS parcels maps, Soil Properties Maps, Imagery, protected zones,</p>
	<p>Are you satisfied with this software? (Why?)</p>	<p>a) Partly Yes, but we would like to collect data in one database in the future.</p> <p>b) As far as is supported by service organization, yes. It is used friendly. It has the time dimension as you put information in it.</p> <p>c) Partly Yes, just for government needs, customer agreements</p> <p>d) Partly Yes, just for government needs, customer agreements</p>
	<p>Does this system support collaboration with other software (if yes, how)?</p>	<p>a) Communication and data exchange with MS Office, base GIS systems and web GIS systems via WMS, WFS,</p> <p>b) Just through the ESRI file format and simple text format.</p> <p>c) No</p> <p>d) No</p>
	<p>Does this system allow inputs from external sources (if yes, which sources)?</p>	<p>a) Windows Based systems, GIS systems- Esri files, Tab files</p> <p>b) Just through the ESRI file format and simple text format.</p> <p>c) No</p> <p>d) No</p>
	<p>Does system supported Web communication (if</p>	<p>a) Yes, Prefarm – Denik honu (field notes) – WFS, WMS</p> <p>b) Yes WFS, WMS</p>

	yes how)	c) No d) No
	Does system support mobile communication (if yes how)	a) Yes, Prefarm – Denik honu (field notes) support data exchange via GPRS b) Yes, Prefarm – Denik honu (field notes) support data exchange via GPRS c) No d) No
Do you have any software to support you in the interpretation of the spatial data (digital map) collected in your farm? (Please list them and describe them)?	Do you have any software to support you in the interpretation of the spatial data (digital map) collected in your farm? (Please list them and describe them)?	Prefarm – Denik honu (field notes) – Pc tab software connected to web GIS application via Internet connection for data collection and data using for making decision and feedback for government statistic – focus on crop and animal production – for managers in Crop production
	Which is the producer of this software?	Czech local producer, Help Service Remote Sensing
	Which part in the production phase does it cover?	See above
	Are you satisfied with this software? (Why?)	Yes, help mi to make fast overview and decision on time
	Does this system support collaboration with other software (if yes, how)?	Any Esri file and text file support software,
	Does this system allow inputs from external sources (if yes, which sources)?	Yes, from web sources and Pc base sources

	Does system supported Web communication (if yes how)	Yes, WMS, WFS.
	Does system support mobile communication (if yes how)	Yes, data transport via GPRS
Do you have any software to support software packages support you in your decision making process for your farm management? (Please list them and describe them	Do you have any software to support software packages support you in your decision making process for your farm management? (Please list them and describe them	Prefarm – Denik honu (field notes) – Pc tab software connected to web GIS application via Internet connection.
	Which is the producer of this software?	Czech local producer, Help Service Remote Sensing
	Which part in the production phase does it cover?	Recommendation for VRA fertilizer and crop protection, yield mapping, soil mapping, as applied maps, satellite imagery
	Are you satisfied with this software? (Why?)	Mainly Yes, some part would be improved
	Does this system support collaboration with other software (if yes, how)?	Yes, data export – import, web communication
	Does this system allow inputs from external sources (if yes, which	Yes, Esri and text files,

	sources)?	
	Does system supported Web communication (if yes how)	Yes, WMS, WFS
	Does system support mobile communication (if yes how)	Yes, via GPRS
Do you have any software package to support your collaboration with other organizations (advisory services, food producers, service organizations, etc)	Do you have any software package to support your collaboration with other organizations (advisory services, food producers, service organizations, etc)	Prefarm – Denik honu (field notes) – Pc tab software connected to web GIS application via Internet connection.
	Which is the producer of this software?	Czech local producer, Help Service Remote Sensing
	Which part in the production phase does it cover?	Recommendation for VRA fertilizer and crop protection, yield mapping, soil mapping, as applied maps, satellite imagery
	Are you satisfied with this software? (Why?)	Mainly Yes, some part would be improved
	Does this system support collaboration with other software (if yes, how)?	Yes, data export – import, web communication
	Does this system allow inputs from external sources (if yes, which	Yes, Esri and text files,

	sources)?	
	Does system supported Web communication (if yes how)	Yes, WMS, WFS
	Does system support mobile communication (if yes how)	Yes, via GPRS
Do you use Internet in your farm?		Yes
	For which purpose?	Regional Weather forecasting, News policy information, Commodity market information to schedule the crops and time of product selling, Agriculture World View - Prospect Source for technical information, General News. LPIS, Farmer – government info and controlling Prefarm – web application – decision support tools
	What kind of connectivity?	Wireless
	What is the speed of connection?	1 Mbps
Do you use some external organization for managing part of your data		Yes, there is service support for data collection, data processing, recommendation services, application services, data store services and ect.

	Which organization?	Agriculture Service support - MJM Litovel a.s.
	Which kind of data	GIS data, recommendation, VRA and MVRA data, support in Yield mapping, data collection
Do you agree to share part of your data with other organizations		Yes
	Which data?	The Agronomic data, crop production, etc.
	With whom?	The Service partner for collaboration reasons.
Do you think, that some your data has to be protected		Yes
	Which data?	Every data in farm must be more or less protected
	Against whom?	Other competitors, third part people
Do you think, that your data could be safe, if they will be stored on some protected server outside of your organization		Yes, some of
	What kind of guarantees you require?	full guarantee
	Do you prefer to have some other security tools (hardware key)?	No
	Who could manage your server?	Service organization-professional people
	Which part of data has	Know how, agreements and etc.

	to be stored only inside of your organization	
What functionality is missing in your software packages, which you use?		<p>Online data weather collection</p> <p>More chance of Web communication</p> <p>More mobile communication</p> <p>More flexible data editing</p>
Which kind of information do you see in future as important for your decision		<ul style="list-style-type: none"> - On-line data collection with several prediction models for final decision making - Crop variability measurement – periodically in ones a week. - More detailed and cheaper soil and crop properties mapping - More detailed machinery-cost acquisition - Regional crop rotation effectiveness information - Market demands
Which kind of decision support or knowledge management tools you see as important for your future decisions		<ul style="list-style-type: none"> - Effective regional crop models (soil tillage, variety, crop feeding, crop protection, weather prediction models includes) - Cost pre-calculation and online models for deferent crops, - Local farm production models

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5.2 WIMEX

Question	Wimex
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Basic software info	Which software do you use in your farm (Please list them and describe them)?	<ul style="list-style-type: none"> a) MS Office b) Agro Sense (farm management system) c) Yield mapping system (Agrocom and Fieldstar)
	Which is the producer of this software?	<ul style="list-style-type: none"> e) Microsoft f) AGRO-SAT Consulting GmbH g) Agrocom
	Which part in the production phase does it cover?	<p>Finances, economics, documentation, planning instrument, Yield monitoring, soil mapping (content of nutrients on basis of soil sampling) maps of potential yields, calculation of costs of machinery and processes,</p> <p>Farm management system, planning instrument for seeding, fertilization and application of pesticides, creation and documentation of tasks</p>
	Are you satisfied with this software? (Why?)	Yes
	Does this system support collaboration with other software (if yes, how)?	partial to MS-Office
	Does this system allow inputs from external sources (if yes, which sources)?	partial to MS-Office
	Does system supported	No

	Web communication (if yes how)	
	Does system support mobile communication (if yes how)	partial yes, use basic data (application maps and tasks) on the RPDA to control, the seeding or application of fertilizers and pesticides using GPS
Do you have any software to support you in the interpretation of the spatial data (digital map) collected in your farm? (Please list them and describe them)?	Do you have any software to support you in the interpretation of the spatial data (digital map) collected in your farm? (Please list them and describe them)?	As previous
	Which is the producer of this software?	
	Which part in the production phase does it cover?	
	Are you satisfied with this software? (Why?)	
	Does this system support collaboration with other software (if yes, how)?	
	Does this system allow inputs from external sources (if yes, which sources)?	

	Does system supported Web communication (if yes how)	
	Does system support mobile communication (if yes how)	
Do you have any software to support software packages support you in your decision making process for your farm management? (Please list them and describe them	Do you have any software to support software packages support you in your decision making process for your farm management? (Please list them and describe them	As previous
	Which is the producer of this software?	
	Which part in the production phase does it cover?	
	Are you satisfied with this software? (Why?)	
	Does this system support collaboration with other software (if yes, how)?	
	Does this system allow inputs from external sources (if yes, which sources)?	

	Does system supported Web communication (if yes how)	
	Does system support mobile communication (if yes how)	
Do you have any software package to support your collaboration with other organizations (advisory services, food producers, service organizations, etc)	Do you have any software package to support your collaboration with other organizations (advisory services, food producers, service organizations, etc)	No
	Which is the producer of this software?	
	Which part in the production phase does it cover?	
	Are you satisfied with this software? (Why?)	
	Does this system support collaboration with other software (if yes, how)?	
	Does this system allow inputs from external sources (if yes, which sources)?	
	Does system supported	

	Web communication (if yes how)	
	Does system support mobile communication (if yes how)	
Do you use Internet in your farm?		Yes
	For which purpose?	Regional Weather forecasting, News policy information, Commodity market information to schedule the crops and time of product selling, Sources for new cultivation and production methods, Agriculture World View - Prospect Source for technical information, Machinery buy and sell transaction, General News.
	What kind of connectivity?	DSL
	What is the speed of connection?	512
Do you use some external organization for managing part of your data		Yes
	Which organization?	Agro-Sat Consulting GmbH Wimex - accounting (Buchhaltung)
	Which kind of data	there is the server for our Farm-Management-System, they

		administrate all spatial data of farm economic and fiscal account
Do you agree to share part of your data with other organizations		Maybe
	Which data?	don't know at the current time this is depending on the topical job
	With whom?	Anyone that will convince me that it is for scientific or safety or collaboration reasons.
Do you think, that some your data has to be protected		Yes
	Which data?	internal data of company (bookkeeping, cost calculation), Farm management system
	Against whom?	Other competitors
Do you think, that your data could be safe, if they will be stored on some protected server outside of your organization		No
What functionality is missing in your software packages, which you use?		Time dimension, Automatic data logging, Web communication Mobile communication Compatibility between them Effective decision support in practice
Which kind of information do		Mid-year crop variability

you see in future as important for your decision		measurement (on-the-go sensors) More detailed and cheaper soil properties mapping In-time weather data More detailed machinery-cost acquisition Regional crop rotation effectiveness information Market demands
Which kind of decision support or knowledge management tools you see as important for your future decisions		Effective regional soil-crop and crop-rotation, climate model,

5.3 Markinos

Question		Markinos
Basic software info	Which software do you use in your farm (Please list them and describe them)?	a) MS Office b) SSToolbox c) FarmTrack –
	Which is the producer of this software?	a) Microsoft b) SST Development Group c) FarmSite
	Which part in the production phase does it cover?	a) Finance, Decision Making b) Boundary Maps, Soil Sampling Scheduling, Soil Properties Maps, Imaging, Yield Maps c) Farmworks
	Are you satisfied with	a) No, too general, needs time b) Not at all. It is not user

	this software? (Why?)	friendly. It is too complicated. It has not the time dimension as you put information in it (You can just input info in different year not inter-year). c) Not at all. Although it is friendly I cannot customize it for my farm-area-country conditions. It seems to fit in USA conditions. It does not include European Standards.
	Does this system support collaboration with other software (if yes, how)?	a) Windows Based systém b) Just through the shape file format and simple text format. c) Yes, through typical spatial formats.
	Does this system allow inputs from external sources (if yes, which sources)?	a) Windows Based systém b) No c) No
	Does system supported Web communication (if yes how)	a) No b) No c) No
	Does system support mobile communication (if yes how)	a) No b) No c) No
Do you have any software to support you in the interpretation of the spatial data (digital map) collected in your farm? (Please list them and describe them)?	Do you have any software to support you in the interpretation of the spatial data (digital map) collected in your farm? (Please list them and describe them)?	See above
	Which is the producer	

	of this software?	
	Which part in the production phase does it cover?	
	Are you satisfied with this software? (Why?)	
	Does this system support collaboration with other software (if yes, how)?	
	Does this system allow inputs from external sources (if yes, which sources)?	
	Does system supported Web communication (if yes how)	
	Does system support mobile communication (if yes how)	
Do you have any software to support software packages support you in your decision making process for your farm management? (Please list them and describe them	Do you have any software to support software packages support you in your decision making process for your farm management? (Please list them and describe them	See above
	Which is the producer	

	of this software?	
	Which part in the production phase does it cover?	
	Are you satisfied with this software? (Why?)	
	Does this system support collaboration with other software (if yes, how)?	
	Does this system allow inputs from external sources (if yes, which sources)?	
	Does system supported Web communication (if yes how)	
	Does system support mobile communication (if yes how)	
Do you have any software package to support your collaboration with other organizations (advisory services, food producers, service organizations, etc)	Do you have any software package to support your collaboration with other organizations (advisory services, food producers, service organizations, etc)	No
	Which is the producer of this software?	

	Which part in the production phase does it cover?	
	Are you satisfied with this software? (Why?)	
	Does this system support collaboration with other software (if yes, how)?	
	Does this system allow inputs from external sources (if yes, which sources)?	
	Does system supported Web communication (if yes how)	
	Does system support mobile communication (if yes how)	
Do you use Internet in your farm?		Yes
	For which purpose?	Regional Weather forecasting, News policy information, Commodity market information to schedule the crops and time of product selling, Sources for new cultivation and production methods, Agriculture World View - Prospect

		Source for technical information, Machinery buy and sell transaction, General News.
	What kind of connectivity?	ADSL
	What is the speed of connection?	2 Mbps
Do you use some external organization for managing part of your data		No, there is not any like that.
	Which organization?	
	Which kind of data	
Do you agree to share part of your data with other organizations		Maybe.
	Which data?	I can not realize.
	With whom?	Anyone that will convince me that it is for scientific or safety or collaboration reasons
Do you think, that some your data has to be protected		Yes
	Which data?	Soil quality data or input – cost data
	Against whom?	Other competitors
Do you think, that your data could be safe, if they will be stored on some protected server outside of your organization		No. Not at this time point.
	What kind of guarantees	

	you require?	
	Do you prefer to have some other security tools (hardware key)?	
	Who could manage your server?	
	Which part of data has to be stored only inside of your organization	
What functionality is missing in your software packages, which you use?		Time dimension, Greek measurement units, Greek policy official reports, Automatic data logging, Web communication Mobile communication Compatibility between them Effective decision support in practice
Which kind of information do you see in future as important for your decision		Mid-year crop variability measurement (on-the-go sensors) More detailed and cheaper soil properties mapping In-time weather data More detailed machinery-cost acquisition Regional crop rotation effectiveness information Market demands
Which kind of decision support or knowledge		Effective regional soil-crop and crop-rotation model,

management tools you see as important for your future decisions		
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5.4 Bramstrup

Question		Bramstrup
Basic software info	Which software do you use in your farm (Please list them and describe them)?	e) Management software; Brugerdata, Agromat, Næsgaard Mark, Bedriftsløsning f) Ø-90, Navision g) Markkort online
	Which is the producer of this software?	a) private companies, farmers unions b) Farmers unions, private companies c) Danish advisory, farmers union
	Which part in the production phase does it cover?	a) multi functional; decision making, calculating, legislativ b) economy, budgeting c) Boundary Maps, Soil Sampling Scheduling, Soil Properties Maps, Yield Maps, Machinery costs calculator ,
	Are you satisfied with this software? (Why?)	a) yes, some better than other. b) Especially navision, which now is Microsoft owned c) Yes
	Does this system support collaboration with other software (if yes, how)?	d) Yes e) Yes f) Yes
	Does this system allow inputs from external	d) Yes e) Yes f) Yes

	sources (if yes, which sources)?	
	Does system supported Web communication (if yes how)	d) Yes e) Yes f) Yes
	Does system support mobile communication (if yes how)	d) Some e) Yes f) Yes
Do you have any software to support you in the interpretation of the spatial data (digital map) collected in your farm? (Please list them and describe them)?	Do you have any software to support you in the interpretation of the spatial data (digital map) collected in your farm? (Please list them and describe them)?	Auto steering programs marketed by CLAAS and JOHN DEERE
	Which is the producer of this software?	Claas/John Deere
	Which part in the production phase does it cover?	Auto steering, contact to many other facilities like registering or spraying pesticides.GPS based
	Are you satisfied with this software? (Why?)	Systems often do not communicate with each other
	Does this system support collaboration with other software (if yes, how)?	See above
	Does this system allow inputs from external sources (if yes, which sources)?	Some

	Does system supported Web communication (if yes how)	Yes
	Does system support mobile communication (if yes how)	yes GPRS
Do you have any software to support software packages support you in your decision making process for your farm management? (Please list them and describe them	Do you have any software to support software packages support you in your decision making process for your farm management? (Please list them and describe them	See above
	Which is the producer of this software?	
	Which part in the production phase does it cover?	
	Are you satisfied with this software? (Why?)	
	Does this system support collaboration with other software (if yes, how)?	
	Does this system allow inputs from external sources (if yes, which sources)?	

	Does system supported Web communication (if yes how)	
	Does system support mobile communication (if yes how)	
Do you have any software package to support your collaboration with other organizations (advisory services, food producers, service organizations, etc)	Do you have any software package to support your collaboration with other organizations (advisory services, food producers, service organizations, etc)	Yes, the Danish advisory system uses most of the programs and stimulates to use them
	Which is the producer of this software?	
	Which part in the production phase does it cover?	
	Are you satisfied with this software? (Why?)	
	Does this system support collaboration with other software (if yes, how)?	
	Does this system allow inputs from external sources (if yes, which sources)?	
	Does system supported	

	Web communication (if yes how)	
	Does system support mobile communication (if yes how)	
Do you use Internet in your farm?		Yes
	For which purpose?	Regional Weather forecasting, News policy information, Commodity market information to schedule the crops and time of product selling, Sources for new cultivation and production methods, Agriculture World View - Prospect Source for technical information, Machinery buy and sell transaction, General News.
	What kind of connectivity?	ADSL
	What is the speed of connection?	2 Mbps
Do you use some external organization for managing part of your data		No, there is not any like that.
	Which organization?	
	Which kind of data	
Do you agree to share part of your data with other		Maybe.

organizations		
	Which data?	I can not realize.
	With whom?	Anyone that will convince me that it is for scientific or safety or collaboration reasons
Do you think, that some your data has to be protected		Yes
	Which data?	Soil quality data or input – cost data
	Against whom?	Other competitors
Do you think, that your data could be safe, if they will be stored on some protected server outside of your organization		No. Not at this time point.
	What kind of guarantees you require?	
	Do you prefer to have some other security tools (hardware key)?	
	Who could manage your server?	
	Which part of data has to be stored only inside of your organization	
What functionality is missing in your software packages, which you use?		Time dimension, Danish measurement units, Danish policy official reports, Automatic data logging, Web communication

		<p>Mobile communication</p> <p>Compatibility between them</p> <p>Effective decision support in practice</p>
Which kind of information do you see in future as important for your decision		<p>Mid-year crop variability measurement (on-the-go sensors)</p> <p>More detailed and cheaper soil properties mapping</p> <p>In-time weather data</p> <p>More detailed machinery-cost acquisition</p> <p>Regional crop rotation effectiveness information</p> <p>Market demands</p>
Which kind of decision support or knowledge management tools you see as important for your future decisions		<p>Effective regional soil-crop and crop-rotation model,</p>