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Set of Requirements specifications for a multifunctional Farm Portal

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Executive Summary

The role of a Farm Portal is to communicate the multifunctional farm of “tomorrow” of being environmentally and socially friendly, energetic autonomous and enhancing the rural economy will be analyzed. The farmer needs to do documentation but also needs to get benefits out of the new technologies; moreover the benefits must motivate him to use these technologies.

In this deliverable the Farm Portal has been identified, stating clearly its role and its main concepts. This has been done as a visionary Farm Portal. The definition of such a Farm Portal is to support farmers with all their need as well as allowing them to have measurable benefits of using it. Such a farm portal should be an integrated portal for: standardised information for daily needs, plus, structured information on demand, which is in parallel a marketing and communication centre for farmers and their chain partners and in parallel a TRUST CENTRE for traceability purposes.

The next section of this report refers to the requirements of a new farm portal. This portal would reflect to the Multifunctional farm of the future. The requirements of such a portal are required for the better definition of what will this farm portal will contain. These requirements were extracted from people and groups that are related and interested in agriculture and these were identified to be the farmers, consumers, traders and advisors. Personal interviews were carried in Germany, Denmark and Greece on structured questionnaires. Farmers and consumers perceptions towards a farm portal and the specification requirements for the design of such a system are the results of these questionnaires.

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1. Introduction

European retailer specifications on traceability information throughout the supply chain go further than the EU-directive EC/178/2002 specifies. Additionally, the Renewable Directive 2009/28/EC from April 2009 increases the pressure on sustainability of food production. Legislation in the US also gives more pressure on food quality. This base concept recommends an integration of legal based necessities that have to be implemented in the next years in any case with the integration of the farmers' needs and also benefits.

Today large chain partners of the farmers – starting from the Ministry – are building up Web based systems where the farmer is asked to provide information. At first we have to make a note that in many cases of private farming, the information is at ownership of the farmer. Only legal facts or bilateral negotiations can make the farmer sending his data to a chain partner. On the other side we have to take into consideration that a land owner has also a more or less - depending on country - social responsibility to work on his farm on a sustainable manner. Due to the complexity of farming we do not only need penalties to manage sustainable but also more benefits to motivate farmers to do so. This will also guide into higher information needs. To enable this important step, a non ICT and non integrated model would run into enormous high costs that are not feasible. So the single way out is: We need integrated, so called holistic ICT systems! Farm portals will enable to support this needs.

Traceability might be a hub for an integrated farm portal that covers many more needs for the farmers as their today's acceptance is too weak and they do not see the benefits of traceability yet. With the increase of the standards and directives, the danger today may be that there is not a farm portal to be able to handle these rules and be incorporated into the whole system.

A large number of farmers nowadays must manage their farms in a different way than they usually do. It is to some extent important to develop new activities which are totally different from farming. These activities are hotel services, selling products and agrotouristic activities like hiking, riding or biking. A farm that performs joint production of public/non-commodity and private goods is named as Multifunctional (Huylbroeck and Durand, 2003). It is a farm for which multifunctionality is a structuring principle, in other words a set of rules generating short and long term choices (Huylbroeck and Durand, 2003).

The objective of this report was to set the requirements of a farm portal to be able to communicate the multifunctional farm of tomorrow of being environmentally and socially friendly, energetic autonomous and enhancing the rural economy will be analyzed.

This report is divided into two parts. The first part is based on the Work Package 1, on the vision of Future Farm and more specifically on deliverables D1.1.1 (List of External Drivers), D1.1.2 (Analysis of External Drivers) and D1.1.3 (Visions and

Recommendations for Knowledge Management). It has also been enhanced with further requirements for management information systems that could be incorporated into the multifunctional farm portal of tomorrow. The second part refers to the results from a survey to identify the perceptions of the potential users of such a farm portal through personal interviews with farmers.

2. Description of the Future Farm Portal

The farmer needs to do documentation but also needs to get benefits out of the new technologies; moreover the benefits must motivate him to use these technologies.

The guideline for the following description of an integrated farm portal is **to support farmers with all their needs as well as allowing them to have measurable benefits by using it.**

Further we also have to take into consideration that not in all regions – also in developed countries – we will have excellent i-net access available what means we have to support technologies that can use Internet but also have other technologies in place for the farmers support.

In general terms, the proposed farm portal should be an integrated portal for:

- standardised information for daily needs, plus
- structured information on demand, which is
- in parallel a marketing and communication centre for farmers and their chain partners and
- in parallel a TRUST CENTRE for traceability purposes

2.1 TRUST CENTRE Platform

As today quality issues become more and more important and the consumers want to know more about the origin, ethical and intrinsic values of purchased products and at the same time producers are increasingly looking for ways to present their products and production processes to international buyers according to customer needs, a TRUST CENTRE has on the one hand to provide information to the value chain through a value chain traceability solution which allows the consumer to collect information on the specific product purchased in the retail market, on the other hand the TRUST CENTRE has to provide functionality for the producer to present himself on the international market place as a trusted supplier of products. At the same time the TRUST CENTRE functions as a risk management tool for all involved value chain players.

The TRUST CENTRE enables the farmers to show their sustainable production information to an international customer community allowing them to market products to an international community using internet technology and document the

fulfillment of legal requirements and quality requirements such as defined by retailers and Global GAP.

Quality-, traceability- and marketing requirements for local farmers or farmer organizations have to be defined and local partners for taking ownership of a TRUST CENTRE have to be identified.

Production related information can be collected through software solutions or even other software vendor technologies and accumulated in the Agro TRUST CENTRE that must be available country by country. The TRUST CENTRE application can be provided in the form of a dash board, giving authorized parties access to relevant information following strict security and access rules.

The services that this kind of software can deliver are the following:

- Business calculations for single fields or the complete farm
- Nutrient balance calculations for single fields and the complete farm
- Land survey and agrochemical documentation of fields for internal use and exports to EU countries as well as for documentation of fertilizers and herbicides used
- Mapping, GIS, and land organisation needs
- Subsidy management (local adaptation necessary, if needed only)
- Energy balance calculation, CO₂ balance calculations

The above mentioned services as well as the numerous graphically supported analyses of costs, profit margins, nutrient balances per plot and farm are an efficient support tool for farmers and farm advisers. Furthermore, all analyses are supported by incorporated time and activity management and links to regional agricultural and other land management expert databases. These data are used for operational tasks and provide the basis for data evaluation of farms.

The TRUST CENTRE acts as data repository for farm data. These data can be automatically integrated for regional needs as there are:

- General rural area planning
- Logistics for cultivation, harvesting and maintenance or
- For export purpose to allow end users of products to verify the origin.

The farmers, producers and cooperatives in cooperation with the Ministry of Agriculture must have the ownership of the Agro TRUST CENTRE. Downstream value chain members will have access to data stored in the TRUST CENTRE via ICT solutions based on bilateral agreements.

2.2 Traceability Platform

Supply chain information from production to the retailer and end consumer will be aggregated by existing ICT solutions (e.g. Trace Tracker, 2010). The nature and availability of specific supply chain information will be defined by the chain members.

As products move throughout the supply chain from production to the end consumer, the software matches identification codes throughout the supply chain, creating a complete history of a particular food item. Each trading partner can use his own internal traceability system which will be interconnected through a clever IT solution.

Especially for perishable goods proper temperature control is of importance to maintain freshness and quality of products. In this context providers of cold chain visibility solutions are available and must be integrated. As one chain partner incorporated within a software tool, the data from the temperature recorders will provide full visibility throughout the export supply chain (production site, packinghouse, shipping port, destination port, further logistics and storage to the retail outlet) in understanding the impact of time and temperature on product quality and shelf life. Trends and patterns in cold chain performance can be identified and corrective actions put in place immediately.

2.3 Consumer Portal

Farmers must be enabled to do easier, better and cost effective marketing. A portal that integrates the different activities of a farmer and also allows him to do marketing, build up his own homepage, do communication with his customers or potential customers, use the tool also for other purposes will support the farmer and will allow him to earn additional benefit what drives the accept.

A consumer information portal will be provided allowing the specific retailer to present its products included in this project in a completely new manner to the end consumer. Consumer relevant information can be accessed via the web, to be defined by the retailer, and will be the key differentiator between competitors. This efficient marketing tool will promote sales of a particular product with extrinsic values such as sustainability information.

2.4 Farm Portal interfaces

2.4.1 Geographic interfaces

It is important to develop an integral system that will have significant information about the geography of the place of farm. This information will be the farm and the fields including the corresponding database information and structure, plus all infrastructure data needed for further applications such as logistic services. This system will integrate software like GIS (WinGIS®) and new technologies like GPS, in order to georeference the collected data from the fields. All recorded and digitized geo-data including all the attribute information will be combined and converted to a central farm database. The data structure and the interfaces have to be defined and implemented. For this system, users can be educated in using the GIS software and technologies in order to build up and handle the local cartography. It is recommended to evaluate the results from the analyses of collected data in

cooperation with the agriculture and environmental experts to accommodate specific local terminology. In general all users should be able to access the platform in their local language.

2.4.2 Meteorological data integration

To integrate meteorological data into farmers decision making process started thousand years ago with a look into the sky. Today's technologies like intelligent weather stations allow the transfer of the gained base data towards the farmers / advisors location and integrate them into a complex decision making process for many purposes. Supporting decision models will allow farmers not only to make better decisions regarding rain or not rain but also allow decisions of fertilizing how much and when as well as using pesticides suitably. The climate change gives additional pressure to know more about the local weather and the linked new decisions to be done.

The weather data have to be embedded into the integrated farm portals for farmers' support including decision tools at the advisory centers allowing advisors to guide farmers with weather related data and transfer the information into internet and/or inform them via GPRS-telephone, guarantee the long term availability of the data and showcase the results towards the farm community.

2.4.3 Precision Farming interface

Agricultural activities will be collected and documented with the help of software. That describes the base data for cultivation recommendation. To hand out a cultivation recommendation it is essential to integrate the soil data. These soil data will be created on the basis of an ISO model based on soil samples and communicates an ISOline map to the black box on the tractor, respectively fertilizer equipment.

Therefore each tractor with the add-on machine or self-propelling chair (e.g. harvesters) has to be equipped with an appropriate black box.

The ISO-map, once transferred into the black box that controls the fertilizer machines regarding the planned and as well as does the documentation of the done activity. Based on the documented geographic activity an ISO-map on return will again be created.

Depending on activity different data will be documented:

Fertilizing-Input: Planned fertilizing depending on soil map, Output: protocol of fertilizing

Spraying-Output: protocol sprayer activity & if necessary protocol of distance to rivers etc.

Tillage- Output: protocol of machine movement as well as e.g. depth of ploughing

Harvesting-Output: yield map (m² precise)

2.4.4 Agro-chemistry integration

On the one hand fertilizers and pesticides are necessary for a modern farm management but are on the other hand an important cost factor at overall farmers' costs as well as environmental sensitive. All this is demanding an optimized use of chemicals. ICT and new technologies like a.m. weather stations, soil investigations, satellite data like Rapid Eye and their soil moisture maps or chlorophyll- maps will be more and more requirement for better decisions with the target to lower costs optimize the production and minimize negative environmental effects. So it is important to define the requirements of optimized use of fertilizer and pesticides in the fields and then to present the results to the farm community and the best way could be through the farm's portal.

2.4.5 Insurance and Finance integration

The integration of the information coming from the farmers and from the systems (georeferenced data) will enable local insurance companies with the integration of Re-insurance organizations to work with farmers to insure their investments. Nevertheless climate change will also drive the need for such integrative and better decision processes to protect farmers from the increased risks.

Financing is beside insurance one of the requirements of farming. More and better information about farmer customers and their business plans are required because information is becoming crucial for decision processes also for banks. A good trained and capable advisor will be able with the help of the tools to support the farmer with business plans and to enable the financing process.

2.4.6 Machine data interfacing

No farm community will be able to work without agro-machines to increase productivity and optimize the production process. New machines allow the integration of information to optimize their process, like optimized fertilization or optimized pesticides use. Beside technological requirements such a process needs also lots of organizational changes and a better management of machinery by farmers in order to get best results. This could be planned and executed through a specific tool from the farm portal.

2.4.7 Implementation of CO₂ models

The implementation of a CO₂ model will enable farmers, group of farmers or even a complete country to get financing out of the optimization (direct carbon financing out of carbon sequestration or optimization, worldwide implemented or even based on individual country rules like e.g. in Europe). Every model will require the detailed documentation of CO₂ optimization as well as the calculation of all details. This CO₂ balance is documented and can be the base for a carbon financing model. This model could be communicated through the farm portal as a neutral CO₂ farm.

3. Specifications Requirements for Farm Portal

In this section the requirements of a new farm portal are analysed and described. This portal would reflect to the Multifunctional farm of the future. The requirements of such a portal are required for the better definition of what will this farm portal will contain. These requirements were extracted from people and groups that are related and interested in the general subject of agriculture.

In order to specify the requirements developing the farm portal it is important to define which groups of people are potential using it. For a multifunctional farm portal, the groups that are related and interested in farming and its activities are the following:

1. Farm's Owners (main user of the portal)
2. Farmers
3. Traders
4. Consumers
5. Advisors

Farm's owners (main user) is the main user of a Farm Portal and he is responsible for running the portal. He signs the contract with the analyst company and offers them communication with the group of people (stakeholders) (IEEE, 1998).

Farmers are the people who will be interested in visiting such a farm portal, in order to get information or probably to imagine how will be a farm portal for their own farm.

Traders are the part of this diagram process, who are involved in selling/buying products for farming.

Consumers are the people who pay for the products or services and usually decide for the requirements of a portal, because of their choices. (IEEE, 1998).

Advisors are the people who advice farmer for the right decisions depending on his preferences and believing.

3.1 Elicitation Requirements

For specifying the requirements of this portal from stakeholders, analysts must use methodology in order to obtain them. The major method that it is used for specifying requirements for portal (or software) is **requirement elicitation**. Elicitation is the process to obtain information and knowledge about present work and problems from different groups of people (Lauesen, 2000).

Questionnaires are a way to get information from many people. You can use them in two different ways: to get statistical evidences for an assumption or to gather opinions and suggestions. The type of questions of the first way are closed, which means that the answer is between different choices, and the other type is more

open (Lauesen, 2000). This is the method that is commonly used for eliciting requirements, because a special background from the most of the people is not needed.

Four different questionnaires were created for each stakeholder group: farmers, traders, consumers and advisors. Farm owner and farmers were grouped together. The questionnaires are divided in four groups of questions. The first two groups are common for all the stakeholders and referred to general questions like knowledge about agricultural issues, internet use and connections to agricultural holdings. The third group of questions is specific for each target group. The questions are related to their preferences on a farming portal and their interests. The fourth group question is referring to the Farm Management Information System. The questionnaires are attached in the Appendices.

Questionnaires were conducted personally in October and November 2009 in the three different countries, Greece, Germany and Denmark. The sum of each group and country is referred in Table 1.

Table 1. Number of collected questionnaires for each group and country

	Farmers	Traders	Consumers	Advisors
Denmark	28	3	26	3
Greece	21	3	25	1
Germany	19	3	22	2
Total	68	9	73	6

The results from the questionnaires were statistically analysed. Each group was calculated for the descriptive statistics of all information. The questions, which are equal in all questionnaires, were compared with the methodology of student t-tests using a confidence interval of 95%. The statistical analyses were carried out with the SPSS® Release 16 (SPSS Inc., 2007).

3.2 Farm Portal Requirement Specification

The results from this process will be a special document with particular structure. This document is named **Specification Requirements of a Portal**. Specification Requirements of a Portal are basically an understanding of a customer or potential client's system requirements and dependencies at a particular point in time prior to any actual design or development work (Lauesen, 2000 & Whitten, 2000). It's a two-way insurance policy that assures that both the client and the analysts understand the other's requirements from that perspective at a given point in time. It is basic to find what services or functions will a farm portal cover the Stakeholders.

This document is divided mainly into three chapters (Vie, 2000). The first chapter describes the portals' delivers, the group people that are interested in the subject and the definitions of terms that will be used. This chapter has been addressed in

section 3, where the main users of the farm portal have been identified and described.

The second part is referring to the **Functional Requirements**. Functional Requirements are the features that must be included in an information system to satisfy the needs by the users. These requirements are analysed by developers of portal and are checked from the customer if covers his/her criteria (Lauesen, 2000).

The third chapter outlines the Non-Functional Requirements. **Non-functional Requirements** are characteristics and attributes of the system as well as any constraints that may limit the boundaries of the proposed solution (Whitten, 2000). The Non-Functional Requirements will have relation to the results, but it depends mainly on other issues like the amount of money that will be possibly given to analysts for this project.

The Performance Requirements are included in Non-functional Requirements and the reliance to the capability of the systems or servers is necessary. This means that depending on needs of the stakeholders and analysts must predict the possible limit of visits in the portal. A basic issue considered in this chapter is the security of the system.

3.2.1 Functional Requirements

The Functional and Non-Functional Requirements are divided into two categories based on the preferences of each of the two main groups (farmers and consumers). Statistical analyses for the advisors and traders were not carried out due to the small number of samples. The preference of each group which was scored over 3 was eligible for using them in the Farm Portal. The results from the other two groups were used as qualitative results to complement these results.

Functional Requirements include all the important information that is elicited from the statistical analyses of questionnaires. Most important for the portal is at least the offering of one more language, together with the native, in order to be readable from a bigger audience, as well as online weather forecast (Table 2).

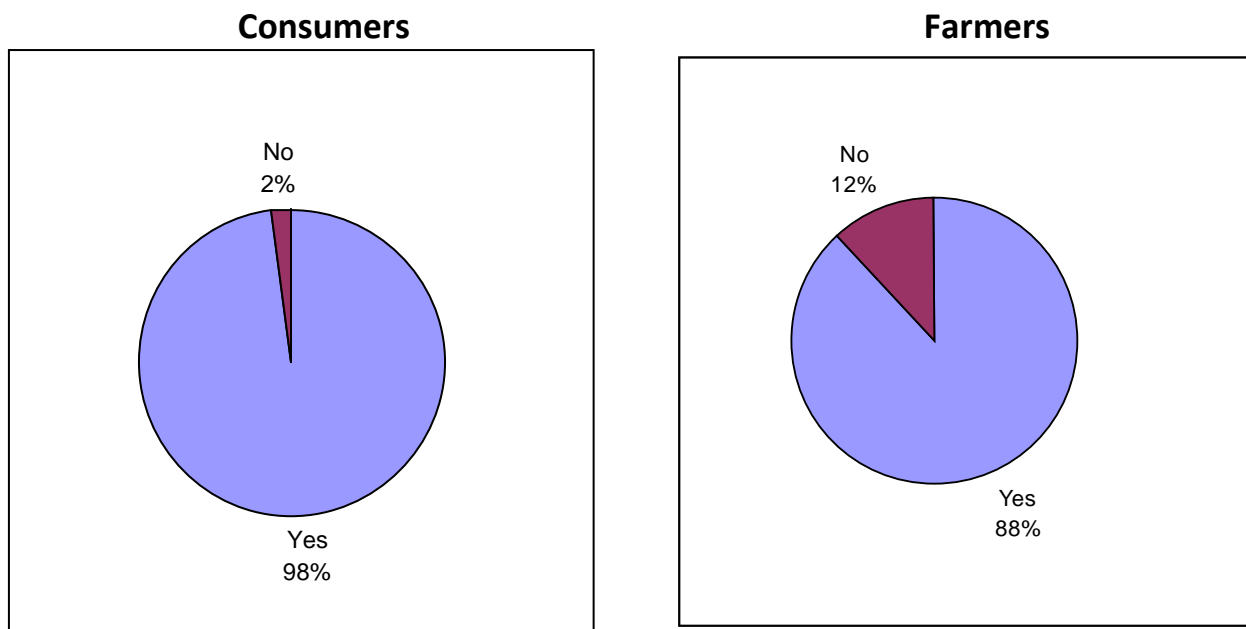
Table 2. Relevance of information for farm portal

Variable	Mean Farmer	Mean Consumer
Site	3,278	3,432
Size	3,056	2,910
C.V.	2,887	2,364
History	2,712	2,750
Soil	3,444	3,093
Climate	3,436	3,091
Natural Conservation	2,981	3,186

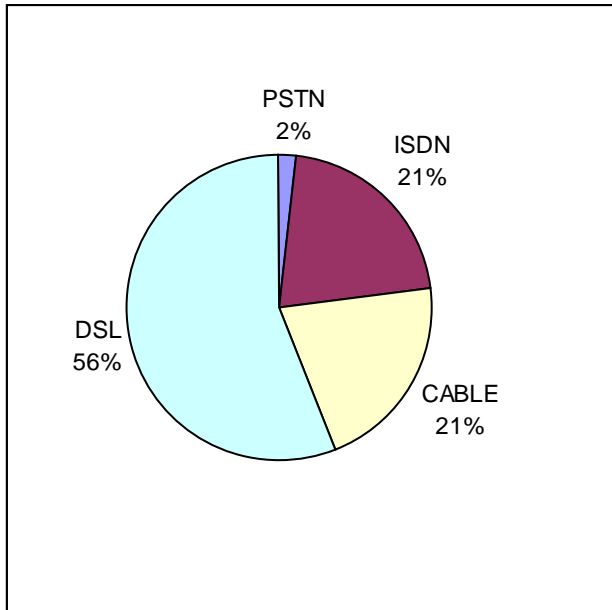
Machinery	3,473	3,022
Cooperatives	2,925	2,930
Global prices	3,893	3,047
Buying place	3,857	3,429
Online Weather**	4,196	3,279
Forum	2,830	2,415
Experimental Sites	3,286	3,326
Events	3,418	3,341
Languages	4,125	4,023

** Significant with interval confidence 0,01

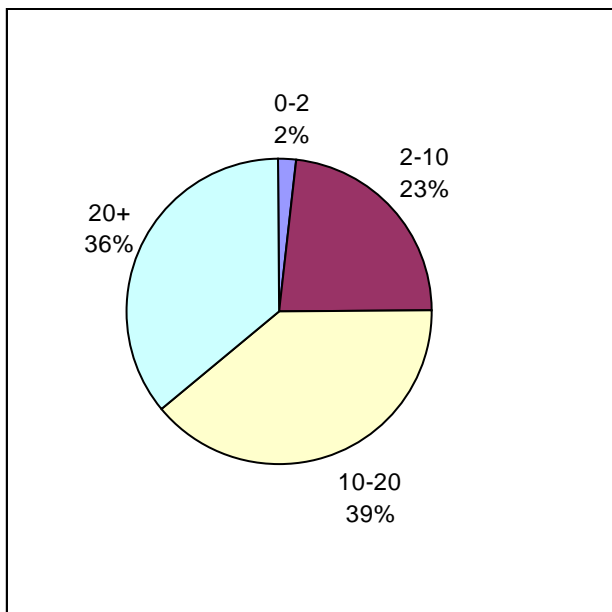
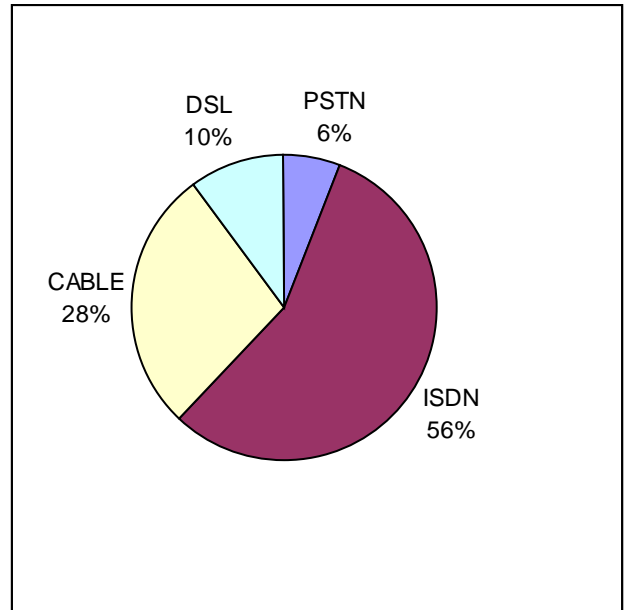
The measurements are from 1 to 5, in which 1 means not significant and 5 means very significant.



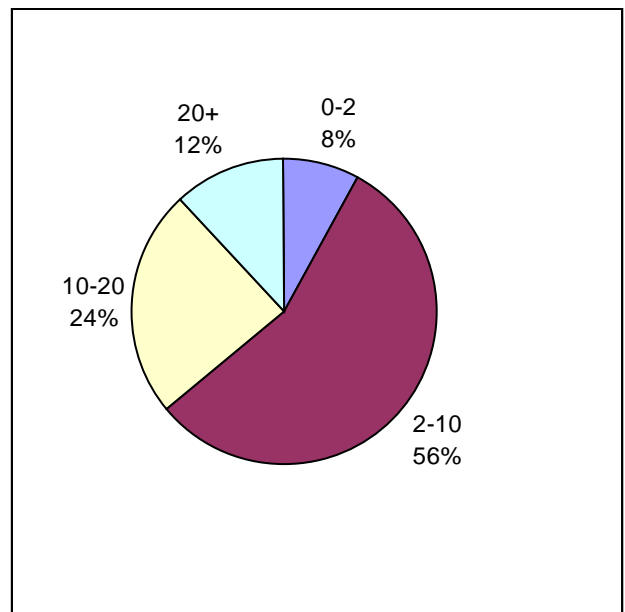
Graph 1. Possibility of using internet (%)

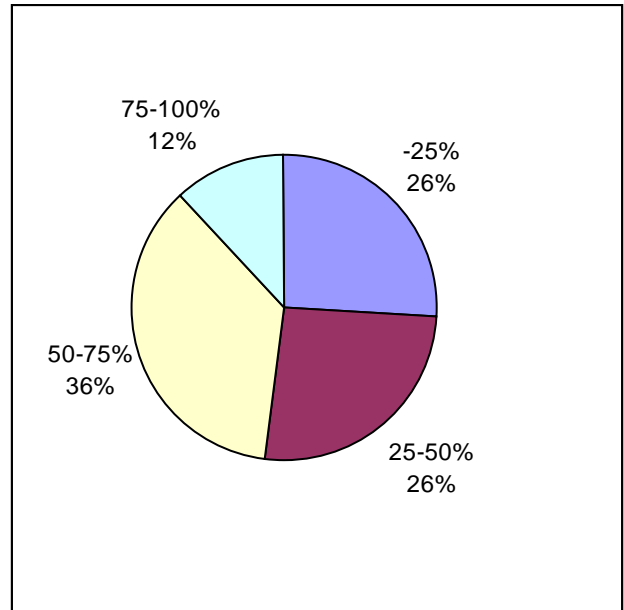
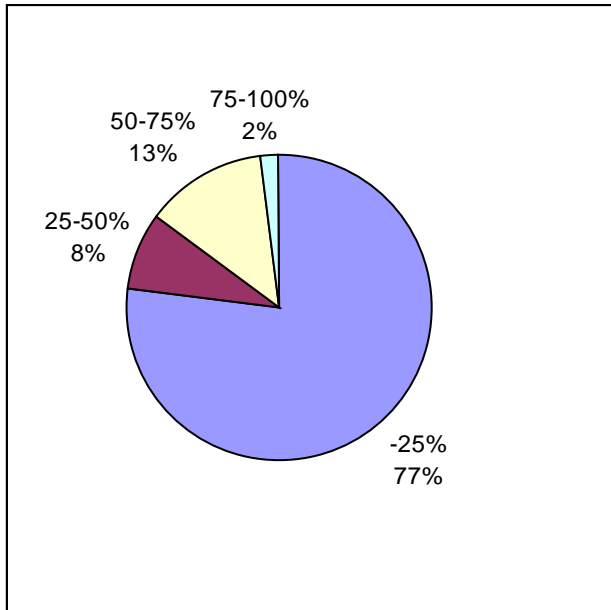


Graph 2. Type of internet connection used (%)

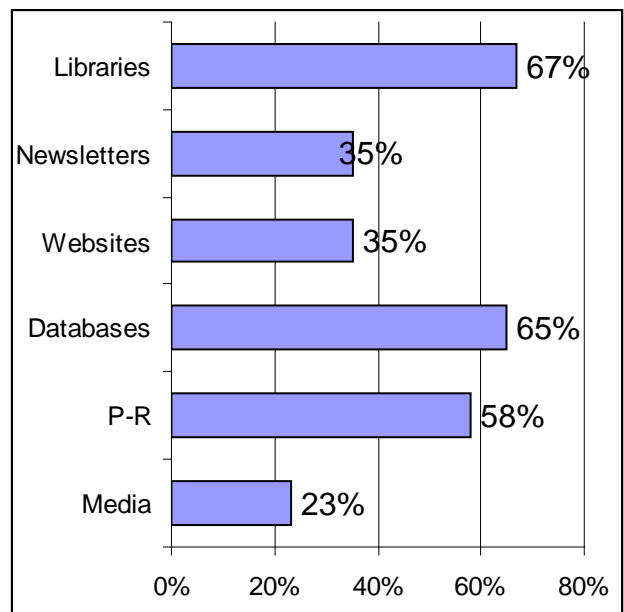
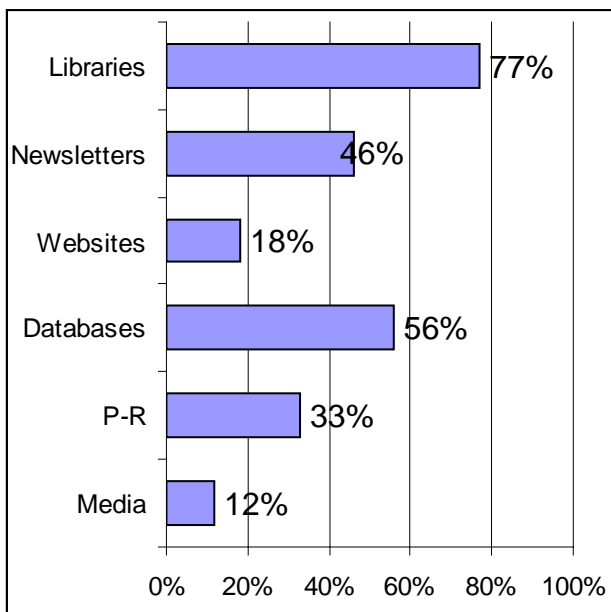


Graph 3. Time spent for using internet (hours/week)

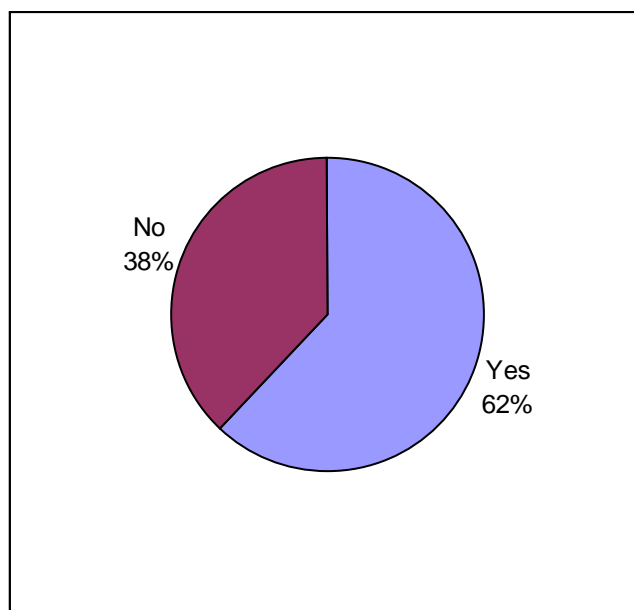




Graph 4. Percentage of time spent online for agricultural issues in relating to the whole time spent online (%)



Graph 5. Source of information winning about agriculture



Graph 6. Will you give a feedback about a farm product via internet as a consumer?

Table 3. Required knowledge about agricultural issues

Variable	Mean Farmer	Mean Consumer
Global Gap*	2,193	1,822
C.A.P.	3,368	2,532
Cross Compliance	3,439	2,174
Integrated Crop Man.	3,229	2,277
Biological	3,105	3,085
Precision Agriculture	3,052	2,681
FMIS	2,649	2,340

**Significant with interval confidence 0,05*

The measurements are from 1 to 5, in which 1 means no knowledge and 5 means very good knowledge.

Table 4. Consumers' preference in Farm Portal about production process

Variable	Mean
Field Management	2,812
Nature Conservation	3,624
Antibiotics	4,012
Animal Welfare	3,833
Diversity of Products	3,219
Quality Management	3,902
Standards	3,523

Online Information	2,921
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The measurements are from 1 to 5, in which 1 means not significant and 5 means very significant.

Table 5. Farmers' opinion about the output of a Farm Portal

Variable	Mean
Are you in contact with groups via internet	2,870
Do you think a Farm portal will increase your income	2,245
Do you believe that it will be possible to change public opinion about farming in general with a Farm Portal?	2,860

The measurements are from 1 to 5, in which 1 means no and 5 means yes

Table 6. Farmers' opinion about the agrotouristic chances

Variable	Mean
Hotel	1,500
Sell	2,614
Riding	1,727
Cycling	1,476
Hiking	1,581
Holidays	1,535

The measurements are from 1 to 5, in which 1 means not significant and 5 means very significant.

Table 7. Farmers' opinion about Farm Management Information System

Variable	Mean	
How interesting would be the FMIS for you	3,544	
Farmers with positive Opinion about FMIS (bigger or equal to 3)	Income	3,474
	Field Management	3,895
	Resource Management	3,789
	Winning time	3,486
	Documentation	3,649
	Comply to Regulations	4,053
	Faster information Fow	3,853
Farmers with negative Opinion about FMIS (less than 2)	No internet	1,667
	Time cons	2,833
	Special Knowledge	3,812
	High cost	3,211
	No benefit	3,167
	Non-understandable issue	1,643

The measurements are from 1 to 5, in which 1 means not significant and 5 means very significant.

Table 8. Consumers' preferences for farming products

Variable	Mean
Price	3,604
Appearance	3,622
Brand name	2,292
Local farming product	3,542
Integrated Crop Management farming product	2,386
Ecological farming product	3,333

The measurements are from 1 to 5, in which 1 means not significant and 5 means very significant.

Broadband internet connection has a high percentage of penetration by consumers and farmers as presented in Graph 1 and 2. This may admit better design layout of the portal with high quality of images and videos. This will help the users of the portal to have an easier look of it and will make it more attractive to bigger audience (Graphs 3 and 4).

It is very important for the users of the portal to find information about the farm. From the collected questionnaires (Table 2) it is concluded that very important information, for both groups, are the site of the farm, climatic and soil conditions. It is very important to have some information about experiments that are carrying out in the farm. This information will be the kind of experiments, the place and size of experimental field and with which research institute or university they collaborate with (Table 2). It must be referred a connection to advisory services like Farm Management Information System (FMIS), which can help farmers to make better decisions for their farms (Table 3 and 7).

Regarding information about the products that produced in the farm, the most important are the main strategies standards, regulations and practices (animal welfare, antibiotics) and are followed by the production processes for the crops and the animals (Table 2 and 4). It is very important to have a link to other portals that can help people, mainly consumers, in order to understand more about agriculture like the standards that are applied in the EU such as Cross Compliance, Common Agricultural Policy and others (Table 3) or Practices that are referred to Natural Conservation. On-line weather of the place of farm is also useful information of this portal (Table 2).

Consumers also will have the opportunity to buy agricultural products direct from the farm (Table 2). In order to improve the farm products, it is very important to have a place where everybody can refer if there is any problem or can make comments about the product (Table 8 and Graph 6).

Finally it is important to have a webpage where the farmer will refer about the opportunities for accomodation and visiting the farm for different activities such as

riding. Furthermore the announcements for upcoming events on-farm or in the surroundings can attract Farm Portals, whereas this needs fluent actuality (Table 2).

On the other hand it must be referred that some information that are not so much useful to present in a farm portal (Table 2). This information is about farm history, the curriculum vitae of farmer and cooperatives. Finally, forums and blogs are not requested by many interviewees.

3.2.2 Non-Functional Requirements

From the functional requirements that are elicited from the questionnaires, it is obligatory to elicit also the non-functional Requirements. Non-Functional Requirements are divided into two basic categories, Performance and Security Requirements.

Performance Requirements

The portal and all associated application systems must be designed to allow for continuous operation on a 24-hours basis. The portal must be shown to be capable of maintaining the integrity of all the data which it controls and makes available to other people. The capacity of the server that is going to host the portal must be quite big, because of the necessity of at least two languages (Appendix I – Table 1).

Security Requirements

The necessity of communication of farmers with advisors and research institutes brings new ideas in agriculture. The biggest problem of this communication is the security issue. It is very important to secure the information and communication from undesirable invasion. This means that private data of farmers mainly must be encrypted for transfer so that it cannot practically be intercepted by other party. The personal information of farm customers have to be preserved from misuse buying products via internet.

3.2.3 Document of Farm Portal Specification Requirements

<p>1. Scope</p>	<p>1.1 Identification</p> <p>The farm portal will be a portal of a multifunctional farm.</p> <p>1.2 System overview</p> <p>Farm Portal is the prospective way of communication of farm's owner to the outside world. In this way of communication, multifunctional farm of tomorrow will bring new ideas and information about farming. Different groups of people who are occupied or interested in farming are coming closer and the quality of services and products can become better.</p>
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	<p>1.3 Document overview</p> <p>This document presents the requirement specification and functional design of a Farm portal for the EU project FutureFarm. The requirement specifications are a set of functions that the portal should be implemented to support.</p>	
<p>2. Referenced Documents</p>	<p>2.1 Project documents</p> <p>EU project FutureFarm (www.futurefarm.eu)</p> <p>2.2 References</p> <p>Lauesen, S., (2000) Software Requirements-Styles and Techniques.</p> <p>Bramstrup Farm, www.bramstrup.dk</p> <p>Process Impact, Software Process Improvement Consulting and Education. www.processimpact.com</p> <p>Donn Le Vie, (2002). Writing Software Requirements Specifications</p> <p>Van Huylenbroeck, G., Durand, G. (2003). Multifunctional agriculture: a new paradigm for European Agriculture and rural development. Ashgate Publishing.</p> <p>Jackson, M., Zave, P., (1995). Deriving specifications from requirements: an example, Proceedings of the 17th international conference on Software engineering, Seattle, Washington, United States, pp. 15 - 24.</p> <p>Software Engineering Standards Committee of the IEEE Computer Society, (1998). IEEE Recommended Practice for SRS.</p> <p>Powell, T.,A.. Web Design Complete Reference. McGraw Hill-Osborne. (2000) Berkeley</p>	
<p>3.1 Functional Requirements</p>	<p>Farmers Requirements</p> <ul style="list-style-type: none"> - Better Design Layout of Portal - High Quality Images and Videos - Site or Place and Size of Farm - Soil and climatic condition of 	<p>Consumers Requirements</p> <ul style="list-style-type: none"> - Better Design Layout of Portal - High Quality Images and Videos - Site or Place of Farm - Soil and climatic condition of the

	<p>the farm</p> <ul style="list-style-type: none"> - Strategies and Practices that Farm is following (Standards, EU Regulations, Animal Welfare, Antibiotics, Nature Conservation) - Text of the portal has to be translated at least to one more than native language - Experiments of Farm that are carried out and links to associate Research Institutes and Universities - Links to portals with information about Standards, Regulations and EU directives - Links to Related Portals (Other Farm Portals, Farm Suppliers, Advisory Services) - Online Weather of place where is the Farm laying - Webpage with agrotouristic activities of farm (Accommodation, Visits, Events) - Webpage with presenting and buying farm's products - Online and direct communication of farmers with advisors/regulators and traders via portal links - Updating the prices of Global Market Products (oil, farm products) - forums/blogs are not requested by a prominent number of respondents 	<p>farm</p> <ul style="list-style-type: none"> - Reference in Natural Conservation Practices of farm - Strategies and Practices that Farm is following (Standards, EU Regulations, Animal Welfare, Antibiotics, Nature Conservation) - Text of the portal has to be translated at least to one more than native language - Experiments of Farm that are carried out and links to associate Research Institutes and Universities - Links to portals with information about Standards, Regulations and EU directives - Links to Related Portals (Other Farm Portals, Farm Suppliers, Advisory Services) - Online Weather of place where is the Farm laying - Webpage with agrotouristic activities of farm (Accommodation, Visits, Events) - Consumer's Opinion and feedback about Farm's Products - Webpage with presenting and buying farm's products - Updating the prices of Global Market Products (oil, farm products) - forums/blogs are not requested by a prominent number of
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	<ul style="list-style-type: none"> - No online information about what in farm production process (application and work calendar) - Information about cooperatives, farm history and farmer's Curriculum Vitae are not named as important. 	<p>respondents</p> <ul style="list-style-type: none"> - No online information about what in farm production process (application and work calendar) - Information about cooperatives, farm history and farmer's Curriculum Vitae are not named as important.
3.2 Performance Requirements	<ul style="list-style-type: none"> - 24 hours function of portal - High capacity of server - Capable of maintaining the integrity of all the data 	<ul style="list-style-type: none"> - 24 hours function of portal - High capacity of server - Capable of maintaining the integrity of all the data
3.3 Security and Safety Requirements	<ul style="list-style-type: none"> - Secure communication between provider and visitors of portal - Protection of information that the farmer are uploaded in the portal from undesirable invasion 	<ul style="list-style-type: none"> - Secure communication between provider and visitors of portal - Protection of information from undesirable invasion - Safe transactions of consumers
4. Notes	<p>4.1 Intended use.</p> <p>This Farm Portal Requirements Specification shall be presented to people in the region that it is settled, because it is very significant to have a knowledge about that and impact in local environment and economy.</p> <p>4.2 Definitions used in this document</p> <ul style="list-style-type: none"> - Farm Portal - Multifunctional Farm - User of system - Farmers - Consumers 	

	<ul style="list-style-type: none">- Advisors- Traders- Functional Requirements- Performance Requirements- Safety and Security Requirements
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Discussion and Conclusions

This study presented the requirements for the farm of tomorrow. The farm of tomorrow will represent a multifunctional farm that apart from production will also have to deal with other services, such as agro tourism or small farm shop. The farm portal will be not a single website, but it will be a composite of a number of systems that will altogether make this portal. The core part will be the "Trust Centre" platform that will be a hub of all the processes within the farm, a traceability platform, which will incorporate all the information in the supply-chain and a consumer platform which will act as the marketing tool for the farm. A number of integrated systems and interfaces will supplement these platforms.

The description of the Farm Portal is based on previous work during the FutureFarm project and mainly in the work done in WP1 related to the Vision of the future farm. We just have to mention that additional platforms or integrated systems could be added to specific regions or needs in different parts of the world, while not all platforms or systems will be required for all types of farms.

Regarding the perceptions of the groups of users of the Farm Portal, even though four groups were identified: farmers, consumers, traders and advisors, the majority of the responses were from the first two groups. These two groups will be the primary users of such a portal. The results of the other two groups were useful to give an insight about their perceptions, but were not utilized in this analysis. The results are from three different countries in Europe, Greece, Denmark and Germany which will give an indication of the trends and beliefs for such a farm portal.

The next step in this work is to continue the survey in the same regions and to increase the responses to around 80 responses per group per country to have a more representative sample. Additional, cross analysis will be carried out to compare the responses to demographics and countries. The outcome of this subsequent survey will generate a journal publication.

References

Jackson, M., Zave, P., (1995). Deriving specifications from requirements: an example, Proceedings of the 17th international conference on Software engineering, Seattle, Washington, United States, pp. 15 - 24.

Lauesen, S., (2000) Software Requirements-Styles and Techniques.

Software Engineering Standards Committee of the IEEE Computer Society, (1998). IEEE Recommended Practice for SRS.

SPSS® Release 16, SPSS Inc. (2007)

Powell, T.,A. (2000). Web Design Complete Reference. McGraw Hill-Osborne. Berkeley

Tracetracker, 2010. <http://www.tracetracker.com>. Last accessed, 26/02/2010/

Van Huylenbroeck, G., Durand, G. (2003), Multifunctional agriculture a new paradigm for European Agriculture and rural development. Ashgate Publishing.

Wikipedia, Free online Library, www.wikipedia.org

Appendix I

Questionnaires



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Leibniz-Centre for Agricultural Landscape Research



Athanasios Chatzinikos
Luzia Herold, Bernd Poelling

Questionnaire for Requirement Specification of Farm Portal

Part I. Interviewee related questions

Name: _____

Age: ____ 18 – 44 ____ 45 – 64 ____ 65 plus

Education: Ph.D. M.Sc. B.Sc./Dipl. Student High School Other _____

Gender: M F

Which of the following groups are you belonging to?

- Farmer
- Consumer
- Traders
- Advisory service/Controlling service
- Research institutes & Universities
- Non-Governmental Organisations/Natural Societies
- Other _____

On what administrative level are you working?

- Local
- Regional
- National

- International
- World-wide

Part II. General Questions

1. a. Is it possible for you to use internet?

- Yes
- No

b. If yes, what kind of connection?

- Dialup
- ISDN
- DSL
- Cable

c. How many hours per week are you using internet in general?

- 0-2
- 2-10
- 10-20
- 20+

d. What percentage of this time do you spend for using internet for farming issues?

- 0% - 25%
- 25% - 50%
- 50% - 75%
- 75% - 100%

2. How do you get information about farming issues in general?

- Media
- Public Relations
- Databases
- Portals
- Newsletters
- Libraries
- Other

3.

a. What do you think that is important for you to find in a farm portal?

- b. How important is for you the following issues as a user of a Farm portal?

1 for no important and 5 for very important

	1	2	3	4	5	N.A.
Farm Information						
Site/Place of Farm						
Size of Farm						
Farmer Curriculum Vitae						
History of farm						
Soil data from Farm						
Climate data from farm						
Natural Conservation						
Machinery						
Farming Cooperation						
Other Information						
Global Market Prices						
“Market” Place						
Online Weather						
Forum - Blogs						
Experimental Sites – Relation to Universities						
Events (Field Events, Visiting Days, Accommodation)						
Languages (Local/English)						

- 4.** How do you know about the following issues or topics

1 for no knowledge and 5 for very good knowledge

	1	2	3	4	5	N.A.
Global Gap						
Common Agricultural Policy						
Cross Compliance						
Integrated Crop Management						
Organic Farming						
Precision Farming						

Farm Integrated Information System						
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5. Do you think that communication between farmers and related groups will be mainly internet based in the near future (5-10 years)?

1 for no probability and 5 for sure internet based

1 2 3 4 5 No answer



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Part III. Consumer's questions

1. Do you use internet for updating information of food products?

1 for never and 5 for always

1 2 3 4 5 No answer

2. How do you prefer buying your food products? (possible multiple answer)

- Direct from farm
 Super-Market
 Delivery service
 Square Market
 Internet
 Other _____

3. What are your criteria for choosing food products?

1 for no important and 5 for very important

	1	2	3	4	5	N.A.
Price						
Appearance						
Brand name						
Local farming product						
Integrated Crop Management farming product						

Ecological farming product						
Other _____						

4. In what kind of information are you interested within the production process?

1 for no important and 5 for very important

	1	2	3	4	5	N.A.
Field Management						
Nature conservation						
Antibiotics						
Animal Welfare						
Diversity of products						
Quality Management						
Standards (Regulations)						
Real-time Information						
Other _____						

5. Would you like to give a feedback about the products to the farmers via internet?

- Yes
 No

6. Can a Farm portal improve consumer's opinion about farming?

1 for sure no and 5 for sure yes

- 1 2 3 4 5 No answer

7. a. Are you interested in visiting a farm in your surroundings?

1 for no interest and 5 for very interesting

- 1 2 3 4 5 No answer

b. If you are interested in (3 or higher), for which reason do you want to visit a farm?

- Leisure

- Knowledge about food production
- Knowledge about farming
- Buying food
- Other _____



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Part III. Trader's questions

- 1.** How do you currently communicate with the farmers/farming organisations?
1 for never and 5 for mainly

	1	2	3	4	5	N.A.
Mail						
Internet						
Phone						
Fax						
Personal Contact						
Exhibition & Field days (Events)						
Newspapers/Journals						
Others _____						

- 2. a.** Do you use internet for buying/selling products?
- Yes, for selling/buying products in general
- Yes, for **selling** agricultural products
- Yes, for **buying** products for farming

No

b. If yes, what kind of products are you selling/buying via internet? (multiple answers possible)

Food

Feeding

Livestock

Equipment

Fertilisers

Pesticides

Renewable Energies

Other _____

3. a. Are you interested in Advertisement in Farm portal?

Yes

No

b. If you are not interested in advertisement in farm portals, why are you avoiding from presenting your company in such a portal?

Time

Not connected to Internet

Money

Don't want to show

Other ways of advertisement

c. Will a Farm portal help you to increase your turnover?

1 for sure not and 5 for sure yes

1 2 3 4 5 No answer

4. If you have a portal, will you be interested in providing link to farm portal?

1 for no interest and 5 very interesting

1 2 3 4 5 No answer



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Part III. Advisor-Consultant's Questionnaire

1. How are you in contact with farming/farming organisations/society?

- Mail
- Internet
- Phone
- Fax
- Personal Contact
- Exhibition
- Newspapers/Journals
- Others _____

2. What is the main topic of your advisory service/control?

- Fertilisers
- Plant Protection (Pesticides, Monitoring)

- Regulatory (CC)
- Economy
- Livestock
- Environmental Issues
- Equipment
- New Technology (Precision Farming)
- Others _____

3. If you have a portal, will you be interested in providing a link to a farm portal?

1 for non interesting 5 for very interesting

- 1 2 3 4 5 No answer

4. In what information about the production process are you interested in?

1 for no interesting 5 for very interesting

	1	2	3	4	5
Fertilisers					
Pesticides					
Seeding					
Tillage					
Harvest					
Equipment					
Livestock					
Other _____					

5. Will a Farm portal be useful for the related groups?

1 for no useful 5 for very useful

- 1 2 3 4 5 No answer



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Part III. Farmers' questions

1. Are you in contact with people via internet?

1 for no contact and 5 for only internet based

1 2 3 4 5 No answer

2. a. In case you have a portal of your farm, what of the following information will be provided online?

- Location
- Size
- Your Curriculum Vitae
- Farm History
- Climate Data

- Natural Conservation
- Machinery
- Farming Cooperation
- Experiments on the farm
- Online information
- Forum/Blogs
- Events
- None, I don't want to have a portal

b. If None, What is avoiding you from showing online information?

- Time
- Not connected to Internet
- Money
- No confidence
- Don't want to show
- Other ways of present
- Other _____ (Go to question 5)

3. Do you think a Farm portal will increase your income?

1 for no improvement and 5 for big improvement

- 1 2 3 4 5 No answer

4. Do you believe that it will be possible to change public opinion about farming in general with a Farm Portal?

1 for no probability and 5 for sure

- 1 2 3 4 5 No answer

5. In the future will you offer agro-tourist services and what kind of them?

1 no interest, 5 very interested.

	1	2	3	4	5	N.A.
Room (hotel services)						
Producing/Selling Products						
Horse riding						
Biking						
Trekking						
Holidays for children						
Other _____						

Part IV. Farm Management Information System

FMIS is a systematically designed and in an integrative way developed prototypical solution of flows, technical handling, standardized information exchange and management of data and information on farms of the future in Europe, respecting the demands in complying with standard in agriculture and the relevant links to the value added chain of food production.

1. How interesting would be the FMIS for you?

1 for no interesting 5 for very interesting

1 2 3 4 5

2. If your answer is 3 or 4 or 5, which are the advantages for your work?

1 for no significant 5 for very significant

	1	2	3	4	5
Increase income					
Better farm management					
Better resources management					
Winning time					
Documentation					
Comply to the regulations					
Faster Information flow					
Other					

3. If your answer is 1 or 2, for which following reasons do you disagree with FMIS?

1 for no significant 5 for very significant

	1	2	3	4	5
No Internet connection					
Time consuming					
Special knowledge needed					
High cost					
No benefit					
Non-Understandable issue					
Other					