

Project no. **212117** Project acronym: **FUTUREFARM**  
 Project title: **Integration of Farm Management Information Systems to support real-time management decisions and compliance of management standards**  
 Instrument: **Collaborative project**  
 Start date of project: **1<sup>st</sup> January 2008** Duration: **36 months**  
 Thematic Priority: **THEME 2 FOOD, AGRICULTURE AND FISHERIES, AND BIOTECHNOLOGY**

**Deliverable 1.1.1 Revision: Final**  
**List of external drivers**

Due date of deliverable: **29/02/2008**

Actual submission date: **03/03/2008**

Work package 1: **Vision of the farm of tomorrow**

Organisation name of lead beneficiary for this deliverable:

**Wirelessinfo (WR-INFO)**

**Authors:** Karel Charvat, Frank Dreger, Pavel Gnip, Matej Krocan, Walter Mayer

Accepted by Soren Pedersen, 20/5/2008

Accepted by Simon Blackmore, 26/2/2009

<b>Project co-funded by the European Commission within the Seven Framework Programme (2007-2013)</b>		
<b>Dissemination Level</b>		
<b>PU</b>	Public	X
<b>PP</b>	Restricted to other programme participants (including the Commission Services)	
<b>RE</b>	Restricted to a group specified by the consortium (including the Commission Services)	
<b>CO</b>	Confidential, only for members of the consortium (including the Commission Services)	

## Abstract

The report D.1.1.1 defines an initial list of external drivers that will have a big impact on knowledge management methods and on farming system as a whole in the next 25 years. These external drivers will be analyzed deeply within the next four month on the basis of analysis of literature, but also base on the SWOT analysis realized directly on the concrete farms. The comparison of these external drivers together with current knowledge management methods will form the base for the first vision of a farm of the future and the recommendation for the Farm Management Information System (FMIS), which will be published in the end of first year of the FutureFarm project. Moreover the report defines the methodology for definition of this vision.

### Document history

<b>Version</b>	<b>Status</b>	<b>Date</b>	<b>Author</b>
0.1	Draft	15.2.2008	Pavel Gnip
0.2	Draft	28.2.2008	Walter Mayer
1.0	Final	2.3.2008	Karel Charvat
2.0	Reduced version	1.2.2009	Karel Charvat

## Content

<b>1</b>	<b>INTRODUCTION .....</b>	<b>- 4 -</b>
<b>2</b>	<b>LIST OF EXTERNAL DRIVERS.....</b>	<b>- 6 -</b>
<b>3</b>	<b>ANALYSIS OF EXTERNAL DRIVERS ON THE BASE OF LITERATURE REVIEW .....</b>	<b>- 8 -</b>
3.1	Building database of information sources about recognized external drivers .....	- 8 -
3.2	Analysis of influence external drivers on the base of literature review .....	- 8 -
<b>4</b>	<b>ANALYSIS OF STAKEHOLDERS OPINION.....</b>	<b>- 9 -</b>
<b>5</b>	<b>CURRENTLY USED KNOWLEDGE MANAGEMENT SYSTEM ANALYSIS.....</b>	<b>- 9 -</b>
<b>6</b>	<b>VISION AND RECOMMENDATION FOR FARM OF FUTURE.....</b>	<b>- 9 -</b>
<b>7</b>	<b>CONCLUSION .....</b>	<b>- 11 -</b>
<b>8</b>	<b>ANNEXES .....</b>	<b>- 12 -</b>
8.1	Table for experts SWOT analysis of drivers .....	- 12 -
8.2	Drivers interrelation table.....	- 13 -
8.3	SWOT analysis by stakeholders .....	- 13 -
8.4	Analysis of stakeholders opinion with current farm management systems .....	- 13 -
8.5	Analysis of current farm management systems .....	- 17 -

# 1 Introduction

Over the next 20 years rural Europe will be radically transformed in terms of distribution of people and of economic activity within and across its regions. These changes are inevitable and many forces conspire to bring them about. The common and future position of each important driver in reality can be different; in many cases two drivers may work against each other and their future influence on Agri-production and food market depends on regulations and common policy. For example:

- Food quality and safety ↔ Food requirements for growing population
- Growing requirements for food ↔ Renewable energy production technologies
- Renewable energy production demand ↔ Demand for more environmental friendly production

To overcome these problems, it is necessary to define new methods for farm management, which will look for optimal solutions in changing conditions.

There exist five main Drivers with influence on strategies in world wide organizations and on markets.

They are as follows:

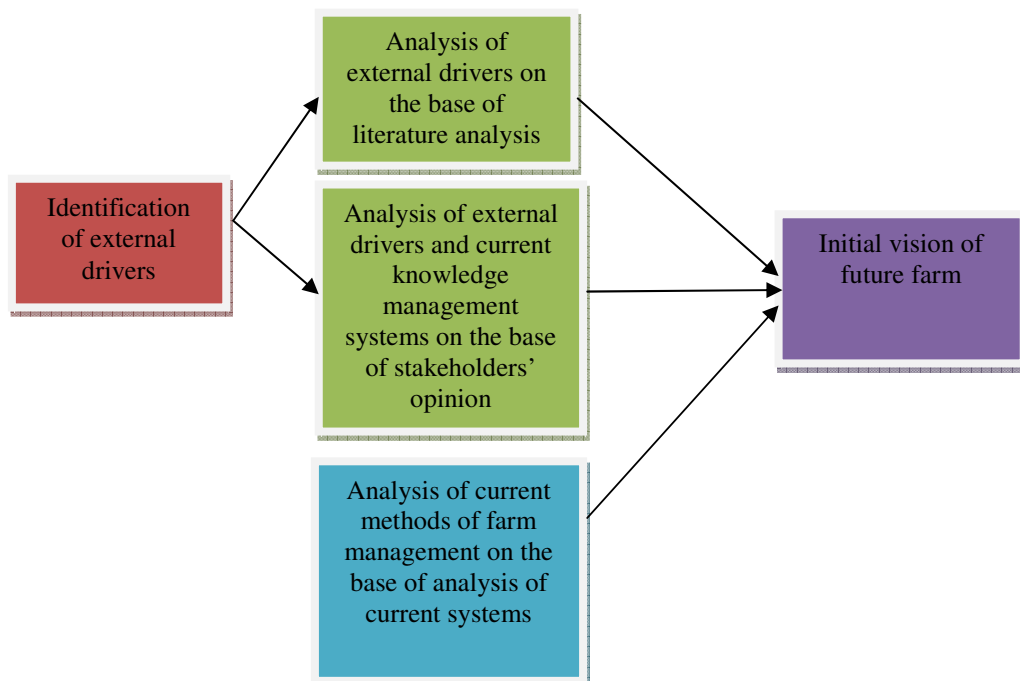
1. WTO negotiations and reform of the Common Agricultural Policy
2. Global competition in production of agricultural commodities and food market with focus on business model and profitability of farmers.
  - Precision Agriculture technologies, adoption of technological-production models by farmers in specific areas in Europe with technological and knowledge support from service organization & Universities and Research organizations
  - Development and Improvements in agricultural productivity from RTD & Innovation in biotechnology and GMO<sup>1</sup> crops
  - Development and improvements of Robots based technologies
  - Development and improvement of New Information and Communication Technologies and their adoption to Agriculture production in rural areas
3. Climate change and its increasing sensitivity to the impact of human activity on the environment as a finite resource
  - Influence of climate changes on crop composition
  - Influence of climate changes on farm management methods

---

<sup>1</sup> Genetically modified organisms

- Bio fuel and low energy consumption crop production models in Agri-business models with focus on IT technologies
  - Maximizing the potential of the Clean Development Mechanism
  - Demographics, low-cost travel and the new life-style aspirations of a mobile citizens
4. Addressing long-term energy security and sustainability challenges
- Energy issues in national development plans and strategies
  - Increasing access to sustainable energy sources and infrastructure
  - Policy priorities for renewable energy technologies
  - Widening Energy Access in Developing Countries
  - The adoption of the Acquits Communitarian by 10 new members states, and further imminent – accessions
5. Social and demographical changes
- Growing population and growing demand of food
  - Urbanization
  - Aging population and health issue
  - Ethnical and cultural changes in society

The objective of WP1 is to define the main external drivers and prepare the vision for the farm of the future in the sense of adaptation of current farm management method. So the work in first year in WP1 could be characterized by the following scheme.



## 2 List of external drivers

Major drivers of future changes include:

- **Climate change** – and its influence on crop composition and management methods
- **Growing population** – will stimulate growing request on food and on energy
- **Energy cost** – will generate new requirements for new methods of energy production
- **Urbanization and land abandonment** – will lead to changes in society and land use
- **Quality of food** - requirements of citizens and market on higher quality of food production
- **Aging population and health problems** – will generate specific requirements on food production and diets
- **Ethnic and cultural changes** – will generate specific requirements on food composition (growing Muslim population in Europe, growing number of vegetarians)
- **Knowledge based bio economy** – will introduce new products and crops, including GMO
- **Regulations and standards** – agreed government norms for the production and use of energy and protection of the environment
- **Economic instruments** – market-based instruments (e.g., taxes, tradable permits) to internalize externalities and promote the cost-effectiveness of energy and environmental policies and measures
- **Subsidies** – phase-out of unproductive and distorted government subsidies (e.g. to energy, transport) and provision of transition supports where a need to ease environmental and social costs of change is necessary
- **Investments** – establishment of undistorted, cost-reflective prices in the energy market and conducive investment conditions to send the right signals to private investors
- **Partnerships and voluntary agreements** – joint public/private programs to develop and deploy sustainable energy approaches with industry
- **Research and development** – government R&D and incentives to private R&D to promote innovation on energy for sustainable development
- **Information and communications** – campaigns to promote better understanding by the general public of the national and international energy and environment situation and future challenges
- **Assessments and scenarios** – sustainability assessments identifying synergies and trade-offs across the economic, environmental and social impacts of energy policy options

- **Valuation of ecological performances**, as long as costs are mainly externalized into the direction of the environment (including agriculture and forestry) and no legal framework exists, necessary changes will be slowly.
- **National strategies** – good governance approaches based on whole-of-government decision-making, transparency, and understanding of the political economy of promoting change in energy systems
- **Politicians** including their political awareness of the existing situation and the necessary changes in the future, including impacts and changes due to environment or technology
- **Press** due to their influence on politicians and their role of being intermediate between public and politics
- **Education** including training and know-how transfer and the awareness of the necessary speed of future changes
- **Cooperation and integration models.** The complex chain in agriculture, biomass and environment as well as the complex structure of chain partners, their behaving addressing new targets including control.
- **International organizations** like World Bank, FAO, CGIAR, etc. with their power/non power to influence necessary changes.

### **3 Analysis of external drivers on the base of literature review**

The first part of the analysis will be based on a review of existing information sources on the internet. The work will be divided into two steps:

- Building database of information sources about recognized external drivers
- Analysis of influence external drivers on the base of literature review

#### ***3.1 Building database of information sources about recognized external drivers***

For the database building a method of Uniform Resource Management (URM) will be used. URM provides a framework where communities can share information and knowledge through their description, which is easy understandable inside the community. In order to effectively share information and knowledge, there has to be a standardized scheme, which will support uniform description of information and knowledge including common vocabularies.

A possibility for solving the discovered problem within a context is to use metadata for standardized description of any information, knowledge, data sources, sensors, etc. In combination with standardized lists of terms (controlled vocabularies or thesaurus, standardized way of geometric location, gazetteers and controlled list of categories), it will increase efficiency of discovery of requested knowledge, information or data sources.

#### ***3.2 Analysis of influence external drivers on the base of literature review***

On the base of available literature sources experts will provide an analysis of each single external driver. Based on expert analysis of single drivers a dependence matrix of external drivers will be created, where each driver will be evaluated according to its impact on each another.

## 4 Analysis of stakeholders opinion

Analysis of stakeholders' opinion will be realized on the base of regional workshops with testing farms or other stakeholders (mainly in language of stakeholders for better understanding of problem).

There will be two main objectives:

- Stakeholders opinion about influences of external drivers on their production
- Analysis of farmer opinion about used knowledge management systems

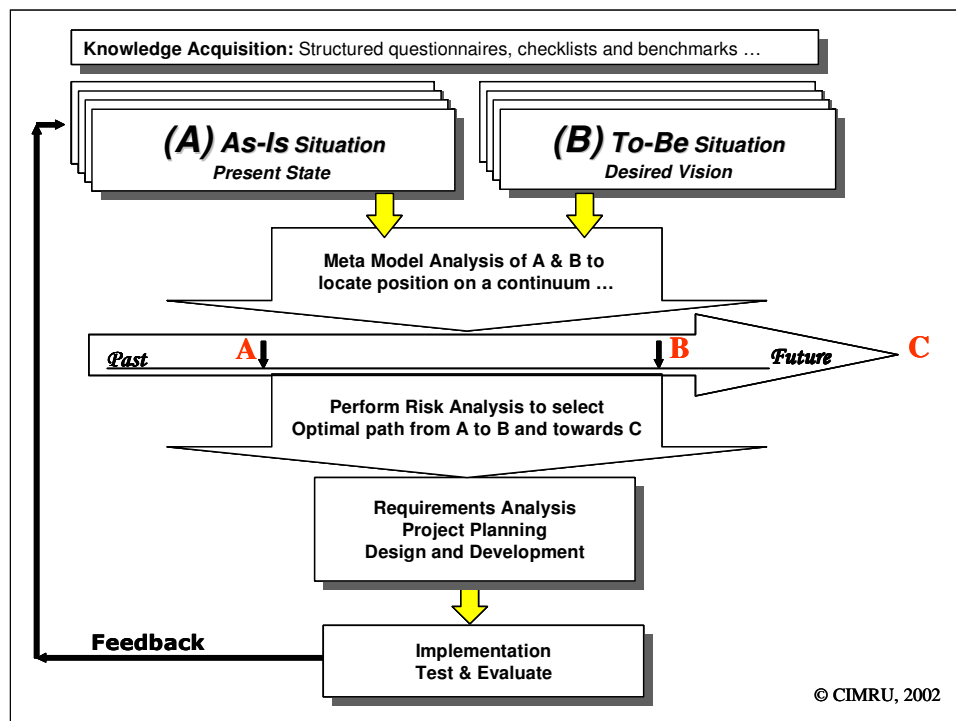
Objectives will be provided on the base of stakeholders' opinion SWOT analysis. Simplify table from previous chapter will be used for the SWOT analysis.

## 5 Currently used knowledge management system analysis

The objective of analysis of knowledge management will be to identify existing systems of knowledge management systems and describe these systems.

## 6 Vision and recommendation for farm of future

The methodology applied within the WP1 of FutureFarm projects is summarized in the next figure. Here we shall just briefly repeat the main issues to provide a basis to follow the analysis of the results.



The FutureFarm WP1 methodology will provide a clear approach on how the needs of the future farm domain can be established in an ordered way. It defines two steps approach. First step is methodology for data and information collection, the second step is analysis of data and information. The analysis will divide into two sections. Each of the sections listed above has analysis relating to the following subheadings:

- **AS-IS:** Current state in the test farm: What does the farm do well or badly at the moment? How does it currently measure success?
- **TO-BE:** Planned objectives: What do you plan to achieve in the next 5, 10 or 20 years?
- **TO-BE:** Visionary objectives: If there were no limits, what would you achieve? What would you want for the farm? The analysis received from these SWOT will provide the basis for the objectives table. These objectives are specific and measurable and classified under the headings of AS-IS and TO-BE. The AS-IS and TO-BE scenarios are defined in terms of the business objectives associated with each state. It provides a list of objectives under each of the value chain headings.

**Business Needs:** The business needs are derived and based on an analysis of the AS-IS and the TO-BE states of the objectives that are chosen. They also take into account the drivers associated with the objectives.

**Constraints:** Running in parallel with the process of determining the business needs is the identification of legislative, regulatory and other types of constraints that may prevent a company from reaching its full potential. Again questionnaires are used to obtain this information and knowledge from the domain players. These questionnaires are introduced to the extended network as part of the questionnaire that establishes the business objectives.

## 7 Conclusion

The report in Capture 2 defines initial list of 23 external drivers from five general groups of different focus. This summary is not a final list and it could be extended based on further analysis and changes. Defined external drivers are not aligning according to their influence in time; however their volume of effect will be important for future focus of farm production generally in time. It might happen that some of the external drivers will loose power of importance in different regions and to different external drivers with bigger relevance. The next literature description of external driver and defined matrix of those drivers is important for their classification in scale of influence in regions and time period for the future. This description will also focus more on importance on the market and time, of each external driver.

Capture 3 “Analysis of external drivers on the base of literature review” defines proposed methodology, which will be used in WP1 thorough out the first year of the project. Proposed questioners for farmers and stakeholders will bring information for reports 1.1.2 Analysis of external drivers, 1.2.1 Knowledge management methods and 1.2.2 Analysis of external drivers. Information about using software, what kind of technology and the satisfaction with technology progress also help for premise direction of next development in this region.

Capture 4. Analysis of stakeholder’s opinion define questioner for stakeholders, which is also very important description and analysis of farms, which provide information.

Capture 5. A analysis of the currently used management information systems will give an overview of the common used software and technology in farm management in different locations and under different conditions.

Capture 6. Vision and recommendation for the farm of the future defines the main issues to provide a basis to follow the analysis of the results.

## 8 Annexes

### 8.1 Table for experts SWOT analysis of drivers

Driver	Climate change
Description of driver	
Short time influence till 2013	
Medium time influence 2020	
Long time influence 2030	
Geospatial influence (world wide, Europe, selected regions)	
Importance ( from 0 – 5 )	
Impact on potential yield	
Impact on prices	
Impact on costs	
Impact on farm management	
Impact on labour resources	
Impact on education	
Impact on environment	
Impact on technical equipment(development)	
COMMENTS	
Strengths	Weaknesses
Opportunities	Threads

## 8.2 Drivers interrelation table

	D1	D2	D3	D4			Dn
D1							
D2							
D3							
D4							
Dn							

## 8.3 SWOT analysis by stakeholders

<b>Driver</b>	
<b>Description of driver</b>	
<b>Strongest</b>	<b>Weaknesses</b>
<b>Opportunities</b>	<b>Threads</b>

## 8.4 Analysis of stakeholders opinion with current farm management systems

Question		Farm
Basic software info	Which software do you use in your farm (Please list them and describe 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 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)?	
	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	Do you have any	

support software packages support you in your decision making process for your farm management? (Please list them and describe them	software to support software packages support you in your decision making process for your farm management? (Please list them and describe 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 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)	
	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?		
	For which purpose?	
	What kind of connectivity?	
	What is the speed of connection?	
Do you use some external organization for managing part of your data		
	Which organization?	
	Which kind of data	
Do you agree to share part of your data with other organizations		
	Which data?	
	With whom?	
Do you think, that some your data has to be protected		
	Which data?	
	Against whom?	
Do you think, that your data could be safe, if they will be stored on some protected server outside of your organization		
	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?		
Which kind of information do you see in future as important for your decision		
Which kind of decision support or knowledge management tools you see as important for your future decisions		

### 8.5 Analysis of current farm management systems

System, software, services name	
Producer	
Which part of production it covered by system, software, services	
Does the system, software, services support analysis of spatial data	
If yes how	
Does the system, software, services support decision making?	
If yes how	
Does the system, software, services supported collaboration	
If yes how	
Basic principle of architecture of solution	
Does have the system, software, services inputs from external sources	
If yes, which	
Does system, software, services outputs into external sources	
If yes which	
Does the system, software, services supported Web communication	
If yes how	
Does the system, software, services support mobile communication	
If yes how	
In which countries is system used	
How long is the system, software, services used	

How many user use system	
How many installation of the system, software, services exist	
How big area is managed by the system, software, services	
How easy is integrate other parts into the system, software, services	
Other important aspects of the system, software, services	
Your comments about the system, software, services	