

Summary report of the workshop on the Agriculture activity and policy field

## **Workshop “Development of core elements of integrated sustainability scenarios for agriculture (Goal definition & Pre-Backcasting)”**

**Florence 19-20 October 2006**

### **PART 2: INPUT PAPERS OF EXPERTS**

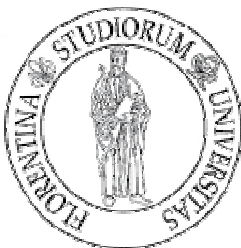
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## **Contents of Part 2:**

### **Input papers of experts**

Input papers were provided by the following experts (in alphabetical order)

**Piorr, Annette:** Scenario development and modelling of policy impacts towards multifunctional agriculture in the EU project MEA Scope “Micro-economic instruments for impact assessment of multifunctional agriculture to implement the Model of European Agriculture”

**Traversac, Jean-Baptiste, Giraud-Héraud, Eric:** Vine, Grape & Wine elaboration in European Union – Perspective and durability, the French experience

**Sieber, Stefan, et al.:** Sensor: Sustainability Impact Assessment of multifunctional land use - Long-term visions of sustainability for agriculture, essential scenario elements and best policy implementation strategies for bioenergy

**Viaggi, Davide:** Scenarios for agri-environmental policy design and implementation



*Working paper, Workshop of the FORESCENE project, Florence, October 19-20, 2006*

## **Scenario development and modelling of policy impacts towards multifunctional agriculture in the EU project MEA**

**Scope** *“Micro-economic instruments for impact assessment of multifunctional agriculture to implement the Model of European Agriculture”*

Annette Piorr<sup>1</sup>

### **Abstract**

This paper refers to scenarios on multifunctional agriculture that were developed on the basis of considerations within the FP6 EU project MEA-Scope and its operational approach in the development of a tool for ex-ante policy impact assessment of multifunctional agriculture. Based on the analysis of the fundamental conceptual views on multifunctionality and of the question how CAP reform instruments as main drivers enforce the delivery of the agriculture's key contributions to sustainable rural development, an indicator framework for commodity and non-commodity outputs related to multifunctionality was developed.

For the development of future scenarios MEA-Scope applied a participatory approach, involving end –users (EC officials), regional stakeholders, scientific experts and modellers. Main drivers and probable future developments of the CAP policies were identified in a series of workshops. On this basis national experts defined three different general scenarios of future agricultural development, to which they assigned complexes of existing and expected policy measures. The description of these scenarios in their relationship to the given policies framework will be the central part of this working paper. For the modelling process these scenarios of future land use developments were linked to possible future policy settings.

The specificity of the MEA-Scope modelling approach lies in the hierarchical linking of pre-existing models at regional and at farm scale, what allows for the provision of results at different spatial scales. This is of particular interest, as the spatial targeting of policies is an essential element for the realisation multifunctionality.

### **How could a desired long-term vision of sustainability for agriculture activity/policy field look like, considering environmental, economic and social elements of sustainable development**

The long term vision of sustainable development is narrowly connected with the question of the future development of land use. On the European scale this question is of particular interest for rural areas, where agriculture is the predominant type of land use. Agricultural land use provides essential economic, environmental and social functions. During the last decades a growing public awareness of the mainly environmental problems, caused by highly intensive agriculture, developed. For policy makers it became an increasing challenge to provide a framework for the

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mitigation of pressures towards environment, and in parallel to improve the social and economic cohesion of rural and urban areas. Multifunctionality is the key concept to enable agriculture to support sustainable development. It emphasizes on the multiple functions and outputs by agriculture beyond the pure provision of food and fibres.

The FAO concept of **multifunctionality** refers to the contribution to sustainable development by considering **environmental, economic and social functions provided by agricultural land use**. The OECD concept of multifunctionality focuses on the provision of non-commodity outputs (NCOs) that are jointly produced to commodity outputs (COs). The supply of multifunctionality by agriculture can be defined as a function of the joint production of COs, which are typical market products (e.g. cereals ...) and NCOs, which are products and functions of the landscape jointly generated by agricultural production which fulfil public or private needs (e.g. biodiversity, fertile soils...) (Casini and Lombardi 2006, Piorr et al. 2005). Depending on the diversity and intensity of production structures (e.g. mixed farm, crop production farm), production systems (e.g. conventional, organic) and/or production schemes (e.g. soil tillage system, amount of fertilizer) the ratio between CO and NCO production and the degree of jointness varies (Sattler et al. 2006, Piorr et al. 2006). Thus, in intensively used agricultural areas due to farm economic reasons the CO/ NCO production ratio is clearly weighted on the production of CO. Contrary, NCO production is rather prevailing in extensively used areas.

Policy settings and payments have a high impact on behavioural changes of farmers and hence the decision making on the production of COs and NCOs, e.g. agri-environmental payments can be regarded as a quasi-market for the production of NCOs.

Especially the latest reforms of the Common Agricultural Policy (CAP) emphasize the role of multifunctional agriculture as an instrument to support sustainable rural development. Since rural areas in Europe vary a lot in terms of geo-physical conditions and urban-rural settings, it comes highly complicated to assess existing policies or potential future policy options regarding their impacts on multifunctionality. To cope with this challenge, special tools are required that reduce complexity and help focusing on the substantial impacts. The task of the MEA-Scope project is to develop such a tool, that allows an assessment for – according the wording chosen on the EC website description for MEA-Scope ([http://ec.europa.eu/research/fp6/ssp/mea\\_scope\\_en.htm](http://ec.europa.eu/research/fp6/ssp/mea_scope_en.htm)) : „...making sure the CAP fits“. At the same time it summarizes the **goals and targets of multifunctional agriculture**:

- enable an adjustment of competitiveness within the EU
- consider the diversity of agricultural and socio-economic conditions
- take into account the strategic goals of
  - sustainable management of Europe's natural resources
  - improving the health, security and opportunities for EU citizens
  - enhancing the economic potential and cohesion of an
  - enlarging Europe

In contrast to these objectives towards sustainable future agricultural land use, the current situation of agriculture in Europe turns out to be highly diverse and faces typical problems, such as those we analyse the MEA-Scope case study areas. Today, the rural landscapes of Europe are undergoing major changes. From 2005, most of the 1st pillar subsidies are decoupled from the production, thereby affecting the land use choices of millions of farmers throughout Europe. Since the policy is not

implemented uniformly across Europe but country-specific, the consequent adjustment reactions of farms may differ.

**Typical European realities** in the MEA-Scope case study areas are:

- significant structural changes, particularly in the dairy and beef production sector
- abandonment of farm land or complete quit of farms, shift towards part time farming
- diversification of farms, farm households take up activities in other sectors, a process that is often depending on the kind of rural-urban relationships (e.g. in Mugello, Italy and Gudenaa, Denmark)
- ageing of farmers (Combraille, France), migration of young people (Ostprignitz-Ruppin, Germany)
- competition between nature protection and production (e.g. Piestany, Slovakia and Borsodi Mezoseg, Hungary)
- technological improvements allowing for integrated economic-environmental cropping management (e.g. Turew, Poland)

Many of these developments can be regarded as long term effects of the agricultural policies of the recent decades. In parallel they already reflect first impacts of the new CAP reform, designed for supporting more sustainability in agricultural land use: Farmers' reactions on the New CAP prove to be individual solutions at the level of farm organisation and management intensity which have various impacts. In the MEA-Scope project, we regard such at different spatial scales, for single farms and for landscapes.

The **main challenge** in order to achieve desired long term visions of sustainability for agricultural activity (from the policy field) will therefore be to **implement policy measures better spatially and thematically targeted**. With the enlargement Europe became even more divers with regard to geophysical conditions and structures of urban rural relationships. Thus territorial potentials are highly different. Also in future agricultural and rural development policies will aim towards the central European strategic development objectives "competitiveness" and "cohesion", both to be improved and both only hardly to be reached on an overall EU-25 coverage. Therefore policies have to be flexible enough to allow for regionally specified implementation, according to the territorial strengths and the regional development objectives. Above all, farmers and rural communities have to develop a better awareness on the development potentials of their regions and their farms to develop their specific profile towards "individual" sustainability. Only then a long term stability of multifunctionality as an individual mix of economic, environmental and social performances can be achieved.

### **Which essential elements of sustainability that are integral part of the vision can be defined for the purpose of developing sustainability scenarios?**

A briefly stated answer on this question is: *The concept of multifunctional agriculture can be regarded as the agricultural land use focussed answer to the development objective of sustainability, and we can consider non-commodity outputs (NCOs) as essential elements to reach this vision.* In parallel, selected NCOs categorised by land use functions and substructured by indicators, provide an operational framework to assess impacts on multifunctionality.

Table 1 lists the NCOs selected for the MEA-Scope project. The indicators were first classified into functional groups of economic, environmental and social sustainability (considering the FAO concept) and in a second step to NCOs (considering the OECD

concept). In a well structured reduction procedure the basic indicator list was adapted to the different levels of use for multifunctionality demand and supply analysis. Due to the comprehensive compilation, table 1 only lists the level of NCOs and the related subcategory. For the assigned lists of indicators with units of measurement we refer to Waarts (2005).

**Table 1: Categorisation of selected NCO by functions (Waarts 2005)**

functional category	selected NCO	NCO subcategory
Economic	Generation of income Employment Rural entrepreneurial activities	
Environmental	abiotic resources biotic resources landscape and land use	<ul style="list-style-type: none"> <li>- water quality</li> <li>- water availability</li> <li>- soil quality</li> <li>- air quality</li> <li>- pesticide use</li> <li>- energy use</li> <li>- biodiversity</li> <li>- habitats</li> <li>- landscape management</li> <li>- landscape pattern</li> <li>- landscape amenities</li> <li>- abandonment of farmland</li> <li>- farming systems (in protected areas)</li> <li>- grassland management</li> <li>- management practices</li> </ul>
Social	Cultural heritage Non-farming activities Social infrastructure Recreation in rural areas Healthy food/food safety Animal welfare	<ul style="list-style-type: none"> <li>- maintaining cultural landscape</li> <li>- maintaining buildings</li> <li>- traditional (farming) practices</li> <li>- nature conservation</li> <li>- educational services</li> <li>- care activities</li> <li>- population characteristics</li> <li>- labour use</li> <li>- health</li> </ul>
<p>The MEA-Scope indicator list is based on the analysis of the following indicator frameworks/references:  The Baltic Environmental Forum, 2000; The BIOGUM project, 2004; Bösch, P., and E. Söderbäck, 1997; The Commission of the European Communities, 2000, 2001; EEA (European Environmental Agency), 2001a, 2001b, 2004; The ELISA project, 2000; The ELPEN project, 1999; The ENRISK project, 2004; European Commission and Eurostat, 2001; EU, 2003; Eurostat, 2001; FASSET, 2004; The IRENA project, 2003; McRae, T., and C.A.S. Smith (eds), 2000; OECD (Organisation for Economic Co-Operation and Development), 2001a, 2001b, 2004, 2004; The PAIS project, 2004; Prescott-Allen, R., A. Moiseev and N. MacPherson, 2000; Reid, W.V., J.A. McNeely, D.B. Tunstall, D.A. Bryant and M. Winograd, 1993; The SAFE project, 2004; UNDP/UNEP/World Bank/WRI (World Resources Institute), 2000; UNEP (United Nations Environmental Programme), 1999, 2001; Wascher, D.M. (ed.), 2000; WHO (World Health Organization) Europe, 2004.</p>		

***The vision of agricultural sustainability from the regional stakeholders view***

From the general scientific opinion, participation a relevant rule in the development of scenarios. In the MEA-Scope project we made use of participatory processes at three levels, involvement of stakeholders, end-users and regional experts. Both NCO demand and the potentials for NCO supply were surveyed accordingly.

For stakeholder surveys in 4 case study regions a 2-step procedure was chosen, the EVM method, consisting of face to face interviews and a workshop.. From a condensed NCO-list the stakeholders (in total n= 50) chose the highlighted NCOs as those they regarded the most relevant to be delivered by agriculture in terms of current and future sustainable development in their regions (cross-country comparison result) (Schader et al 2007):

- Provision of jobs
- **Stimulation of small businesses**
- Prevention of migration of young people
- **Regional tourism**
- Rural livelihood
- Regional food supply
- **Regional food processing**
- Production of safe food
- **Stimulation of rural cultural activities**
- **Recreation in rural areas**
- Keeping traditional socio-cultural identity
- Increased biodiversity
- Animal welfare
- Keeping the cultural landscape
- Soil fertility
- **Hydroecological equilibrium**

### **How can current policy objectives of topic complexes be translated to match with the objectives sustainability scenario**

#### ***Identification of drivers and future policy measures from policy makers view***

In order to ensure the development of the Impact assessment tool according to the end users demands for ex-ante assessment of policies towards sustainable development of agricultural land use, a series of workshops takes place, in which usually 10-15 officials from different general directions (Research, Agriculture, Environment) participated. In a written brainstorming session possible features of a future CAP were collected, structured, weighted according to their importance and relevance (table 2).

**Table 2:** development of drivers and future policy measures from a policy makers view

(Moschitz and Stolze, 2006)

<b>Development of framework conditions (drivers)</b>		
<b>Increased importance of boarder measures (tariffs)</b>	<b>Structural evolution of farms (n. of farms)</b>	<b>Budget restrictions</b> <ul style="list-style-type: none"> <li>▪ Lower overall budget for CAP</li> <li>▪ Decreased direct payments</li> <li>▪ Single farm payments will be reduced, eventually phased out</li> <li>▪ Smaller budget for funds</li> </ul>

<b>Development of the CAP (measures)</b>			
<b>Institutional change</b>	<b>Direct payments</b>	<b>Environment</b>	<b>Decoupling</b>
<ul style="list-style-type: none"> <li>▪ Territorial approach: importance of cohesion objectives</li> <li>▪ Regional diversification</li> <li>▪ Localized policy instruments</li> <li>▪ Individual contract payments for environmental services</li> <li>▪ Payments to „land managers“, not only farmers (managing forests, roadsides, country parks)</li> <li>▪ Agriculture becomes less important for rural development; other sectors might increase their role in income generation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Relative shift from pillar 1 to pillar 2</li> <li>▪ Ceiling of direct payments (max. payment per farm)</li> <li>▪ Stricter cross-compliance</li> <li>▪ Payments linked to contractual obligations related to landscape management, agri-environmental issues, animal welfare</li> <li>▪ Direct payment partly based on standard labour input</li> </ul>	<ul style="list-style-type: none"> <li>▪ Increased „green-box“ subsidies</li> <li>▪ Contribution to climate change (emissions, C capture/storage, bioenergy)</li> <li>▪ Environment responsive</li> </ul>	<p>Further shift towards decoupled, green-box compatible payments</p>

The main result was that the set of policy measures is regarded as the remaining framework, the main questions instead will be: how and where will the measures be implemented?

### **Scenario definition**

In order to explain the following scenario definition, I chose a quadrant model, modified from the Future Landscapes project (Artner et al. 2006). Figure 1 shows a framework for agricultural land use decisions related to the CAP.

Given the Agenda 2000 implementation as start point of possible development directions, the future trends and also impacts are supposed to develop in two directions: intensification and extensification of agricultural land use. The second dimension of interest is related to the implementation of policies: towards general application, what at the same means general spatial coverage, and towards territorial and even individual implementation. The four fields stand for open value-free spaces that describe possible future land use developments along the two axes. All fields can contain both positive and negative aspects. It means they are shaped without limitation in perspective or normative requirements.

We use the quadrant model in a twofold direction: the fields represent spaces for different scenarios of future land use developments and the total quadrant area itself represents the scope on which we chart the policy settings. The respective location and their implementation and impact can be assessed.

In an expert workshop the MEA-scope scientists developed three scenarios that fill the spaces for decision choices as follows:

Figure 1 shows the scope for the policy settings, which at this level are hypothetically set, what based on the modelling results has been approved or shifted, depending on the region by the impact assessment. The respective location shows the focus of the intended trends (on the horizontal axis), and the scope of implementation (on the vertical axis): “General” to be understood as overall coverage, “individual” instead related to spatially limited, spotted implementations, what at the same time means: measures that are tailored for more targeted uses or objectives (e.g. environmental protection, incentives for management changes or diversification). Thus we have to keep in mind that the degree of spatial implementation has to do individual farmers decisions to develop the farm in a certain direction and enter respective contracts.

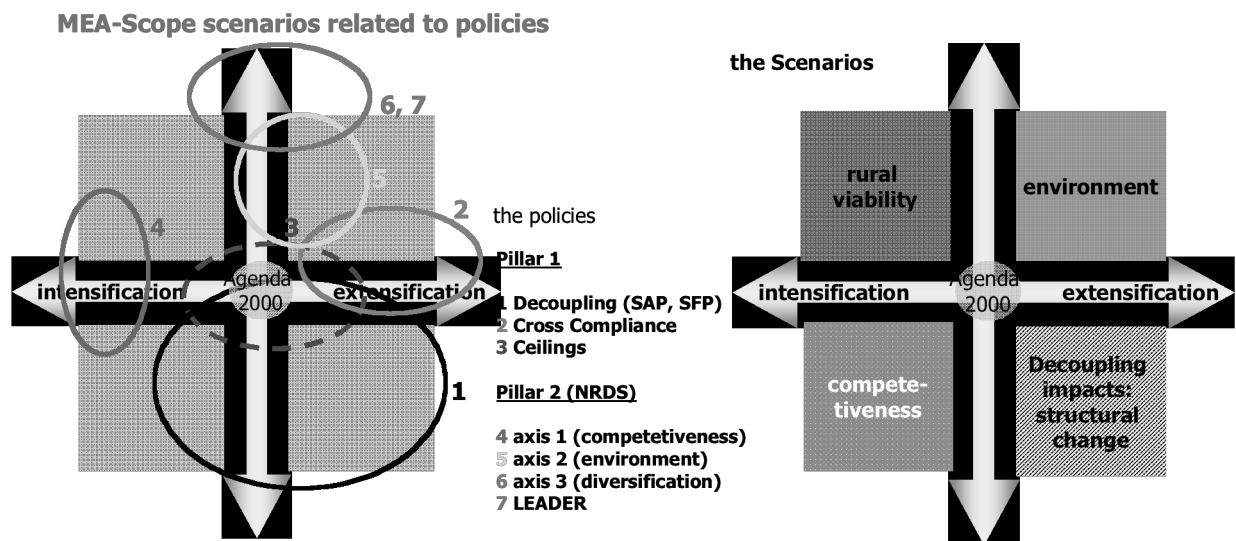


Figure 1: quadrant model for the CAP policy framework and the MEA-Scope scenarios

To explain these relationships further I'll focus on the different scenarios.

When considering the **Decoupling**, we have to be aware that the 1. pillar holds by far the vast majority of budgetary expenditures, what is expressed by the large size of the circle. As the central instrument of the 2003 Reform, the Decoupling of payments from production in form of SFP or SAP is directed towards an extensification, but also can effect intensification, e.g. in regions with a high share of very small farms.

From the reason, that the decoupling as 1.pillar measure, is applied generally, I address the space between `general implementation` and `trend to extensification` as the general CAP policy induced space of decoupling impacts, leading to structural change, and being ubiquitary applied. Coupled to this „basic“ scenario the other scenarios are developed as further differentiations. They can be characterised as follows:

**Scenario “Competitiveness”**

- strong decoupling impacts:
  - specialisation

- farm size: economy of scale (very small farms quit; very large farms reduce the size)
- main implementation scenario for axis 1 funds (competitiveness)
  - investments, new technologies (e.g. precision farming)
  - bioenergy production
- spatial concentration on productive sites

***cohesion challenge: „urban/rural conflicts (e.g. competition between settlement pressures and land use on productive sites in periurban regions) or chances (e.g. hobby farms)?“***

### **Scenario “rural viability”**

- strong linkage to rural development measures: LEADER, others (e.g. INTERREG)
- implementation of axis 1 (competitiveness)
- main implementation scenario for axis 3 funds (diversification)
  - diversification of farms
  - farm household activities in other sectors (e.g. tourism)
  - quality of food
  - extension of territorial potentials and strengths
  - regional networking, farmers involvement in participatory processes

***cohesion challenge: „ not to reach the same quality/ level of rural viability, but an adequate“***

### **Scenario “environment”**

- main implementation scenario for axis 2 funds (environment)
  - agri-environmental programmes (AEOs)
  - organic farming
  - diversity of cropping patterns
  - low input farming
- spatial concentration in protected areas, implementation of Cross-Compliance (CC)
  - Natura 2000
  - WFD, Nitrate Directive
  - GAEC
- spatial concentration on low productive sites

***cohesion challenge: “ to develop new forms of urban users- rural producers-relationships, given the prevailing territorial potentials (e.g. to meet urban demands for recreation, wilderness areas and to meet rural problems due to set aside land and migration of inhabitants)”***

### **Conclusions**

- multifunctionality is an important contribution to sustainability
- non-commodity outputs (NCOs) are essential elements for sustainability scenarios for agriculture
- the diversity of European realities requires territorial focussing on objectives/ of measures

- the 2003 reform of the CAP provides instruments and measures that allow for general, territorial and individual implementation of policies
- policy advice and research issue is how and due to what kind of regional conditions, potentials, structures, incentives,... a spatially and structurally meaningful (= sustainable) implementation is realized in practice
- modelling of scenarios delivers essential results for ex-ante assessment (Happe et al. 2006)
- data availability needs improvement (NMS, social indicators, multi-scale use)
- upscaling of simulation results on farm individual decision making to higher scales will help to further develop the targeting of policies

## References

Artner, A., Frohnmeyer, U., Matzdorf, B., Rudolph, I., Rother, J., Stark, G., 2006: Future Landscapes. BMVBS, Bundesamt fuer Bauwesen und Raumordnung. Bonn

Casini, L., Lombardi, G.V. 2006: Comparison of MEA-based interpretation with interpretations of multifunctionality by other organisations. MEA-Scope publications Vol.2. [http://www.zalf.de/home\\_meascope/website/publications/mea-scope\\_vol2\\_comparison\\_multifunctionality\\_interpretations.pdf](http://www.zalf.de/home_meascope/website/publications/mea-scope_vol2_comparison_multifunctionality_interpretations.pdf)

Happe, K., Damgaard, M., Osuch, A., Sattler, C., Zander, P., Uthes, S., Schuler, J., Piorr, A., 2006: [CAP-reform and the provision of non-commodity outputs in Brandenburg](#). Agrarwirtschaft, German Journal of Agricultural Economics. 55, 5/6, 268-279.

Moschitz, H., Stolze, M., 2006: MEA-Scope workshop II: Assessment of multifunctionality impacts of agricultural production. Unpublished.

Piorr, A., Uthes, S., Mueller, K., Sattler, C., Happe, K., 2005. Design of a MEA compatible multifunctionality concept. MEA-Scope publications Vol.3. [[http://www.zalf.de/home\\_meascope/website/publications/mea-scope\\_vol3\\_mea\\_multifunctionality\\_concept.pdf](http://www.zalf.de/home_meascope/website/publications/mea-scope_vol3_mea_multifunctionality_concept.pdf)]

Piorr, A., Uthes, S., Waarts, Y., Sattler, C., Happe, K., Mueller, K., 2006: Making the multifunctionality concepts operational for impact assessment. In Meyer, B.C. (Ed), 2006. Sustainable land Use in Intensively Used Agricultural Regions. Landscape Europe. Alterra Report No. 1338, Wageningen. 47-54.

Sattler, C., Schuler, J., Zander, P., 2006. Determination of Trade-off-functions to analyse the provision of agricultural Non-commodities. International Journal of Agricultural Resources, Governance and Ecology, 5, 2/3, 309-325.

Schader, C., Moschitz, H., Stolze, M., 2007: Case study on regional differences in social demand for commodity and non-commodity concerns. Series of MEA-Scope reports. Volume 11. in prep.

Waarts, Y. (2005): [Indicators for the quantification of multifunctionality impacts](#). MEA-Scope publications. Vol. 4. [http://www.zalf.de/home\\_meascope/website/publications/mea-scope\\_vol4\\_indicators\\_for\\_multifunctionality.pdf](http://www.zalf.de/home_meascope/website/publications/mea-scope_vol4_indicators_for_multifunctionality.pdf)

# Sensor: Sustainability Impact Assessment of multi-functional land use

Long-term visions of sustainability for agriculture, essential scenario elements and best policy implementation strategies for bioenergy <http://www.sensor-ip.org/>

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## 1 Introduction

The EU-FP6 integrated project SENSOR develops science based ex-ante Sustainability Impact Assessment Tools (SIAT) to support decision making on policies related to multifunctional land use in European regions. The knowledge-based meta-model SIAT is tailored to meet the needs of analysts and policy makers at the European level and enables end users to assess the impacts of land-use relevant EU-policy strategies. The results are presented for European regions (NUTS2/3) across the six sectors agriculture, forestry, energy, transport, nature conservation and tourism. Analytically, SIAT focuses on cross-sectoral trade offs and side effects of the land use related impacts of optional EU-policies. The first policy case on promoting "bioenergy" has been defined. Hence, the paper will focus on the view of bioenergy.

The organiser of the workshop has pre-set questions in this workshop. They are:

- How could a desired long-term vision of sustainability for agriculture activity/policy field look like, considering environmental, economic and social elements of sustainable development
- Which essential elements of sustainability that are integral part of the vision can be defined for the purpose of developing sustainability scenarios?
- How can current policy objectives of topic complexes be translated to match with the objectives sustainability scenario

Based on the SENSOR approach, we address the questions as follows:

## 2 Desired long-term vision of sustainability: The EU targets and strategies

In this chapter we try to answer the question '**How could a desired long-term vision of sustainability for agriculture activity/policy field look like?**' In order to answer the question, we would like to state that:

- General trend scenario development in SENSOR is based on foresight studies for global economic variables not reflecting any "desired", but policy driven visions.
- Scenarios addressing the bioenergy case are based on policy and strategy papers developed at the European Commission.
- Scenario analysis in SENSOR aims at providing information on the "what if" question, that is providing information on possible effects of global trends and anticipated policy interventions on regional sustainability issues.

The EU proposes in a number of white and green paper different strategies which represent the common line of fostering the bioenergy within Europe. In this regard this chapter outlines 'desired' goals and proposed measure in order to achieve these.

## 2.1 A desired EU vision on bioenergy

“Sustainable Development stands for meeting the needs of present generations without jeopardizing the needs of futures generations - a better quality of life for everyone, now and for generations to come. It offers a vision of progress that integrates immediate and longer-term needs, local and global needs, and regards social, economic and environmental needs as inseparable and interdependent components of human progress” (EC 2006).

The **Gothenburg Summit** in June 2001 formulates the following priorities (Gothenburg Summit 2001):

- combat climate change,
- ensure sustainable transport,
- address threats to public health, such as chemicals pollution, unsafe food and infectious diseases,
- manage natural resources more responsibly and stop biodiversity decline,
- combat poverty and social exclusion, and
- meet the challenge of an ageing population.

Promoting bioenergy can be an integral part of a sustainability strategy on a ‘future scenario’ as it tackle to mitigate climate change, contributes to sustainable transport and supports a managing natural resources a better way. Indirectly it can have positive effects on public health as well as social exclusion (due to income possibilities in rural areas).

The EU objectives for bioenergy policies are mainly outlined in the white paper (EC 1997), green paper and the Biomass Action Plan (BAP).

In 1997 the Commission published a **White Paper** on Renewable Sources of Energy (EC 1997). This document gives an indicative target, for both the then 15 member states and the prospective new members, of doubling the overall share of renewable energy in the EU from about 6% in 1995 to 12% by 2010. Table 1 shows how this target is distributed over the various sources of renewable energy. Bioenergy is set to become the most important energy source accounting for three-quarters of the target figure for all renewables.

*Table 1. Targets for renewable energy by source, 2010,  
in million tonnes of oil equivalent (Mtoe), EU-15<sup>5</sup>*

	1995	2010	2004 (EU-25)
hydro-power	26.3	30.6	26.1
wind	0.4	6.9	5.0
solar (panels)	0.3	4.0	0.6
solar (photovoltaic cells)	0.002	0.26	0.09
geothermal power	2.1	4.2	4.5
heat pumps	0.4	1.0	0.9
bio-energy (incl. municipal solid waste)	44.8	135.0	71.4
total renewables	74.3	182.0	108.8
total energy consumption	1366	1583	1747
share of renewables	5.4%	11.5%	6.2%

*Source:* EC 1997; 2004 figures: Eurostat & calculated from EurObservER 2005.

The **White Paper** proposes a number of measures, of which the following are essential for future scenario (EC 1997):

- Regulate preferential access of renewable energy to electricity networks;
- Tax reduction or exemption;
- Favourable tax rates for investment in renewable energy;
- Further promotion of technological research to increase competitiveness;
- Allow state support to renewable energy;
- Incorporate renewable energy in existing programmes (e.g. rural development)

A high number of communications (alternative fuels (EC 2001), White and Green Papers) have resulted in a number of directives, which are policies actually in force:

- Electricity from renewable sources (2001), setting a target of 22% by 2010;
- Promotion of biofuels (2003), specifying that 5.75% of all petrol and diesel should be biofuels by 2010;
- Taxation of energy (2003): Reduced rates on energy from renewable sources;
- Combined generation of heat and electricity (2004) on application of bioenergy
- Targets for transport: 5% of automotive fuels should be biofuels by 2010, 7% by 2015 and 8% by 2020

Another important step is the Biomass Action Plan (BAP) of December 2005. This is mainly a statement of what the Commission intends to do for promoting the use of biomass.

The **Biomass Action Plan** BAP (EC 2005) sets the target for the use of biomass in 2010 at 150 Mtoe on heating, electricity generation and transport fuels. On the demand side:

- For bioheat, the BAP proposes measures to ensure the availability of biomass and the efficiency of installations.
- For electricity, the BAP refers to the target of 21% electricity from renewable energy by the increased use of biomass.
- On transport fuels, the BAP recommends to implement the biofuels directive by tax exemptions, obligates percentage of biofuels and certification for sustainability standards.

Moreover, **BAP** also addresses the following measure on the supply side:

- The CAP reforms of 2003 leave open the possibility of using set-aside land for bioenergy crops including income support to farmers for lower production costs.
- In forestry, there is surplus growth of wood, presently not utilized. The forestry action plan in 2006 deals with how wood can be mobilized for bioenergy.
- The use of waste needs especially technical progress to reduce environmental impact and careful consideration of recycling vs. incineration.
- The supply chain for biomass needs to be improved.
- Proposal of free-trade agreement negotiations with ethanol-producing countries.
- EU financial support from the regional and structural funds as well as from the rural development programme can be used for investing in biomass production.
- Support to technology development.

In the **Green Paper** on energy of March 2006, much less emphasis is placed on renewable energy, including bioenergy, even though it remains important. Out of six priority issues Issue 3 is about the mix of energy sources, where coal and nuclear energy are discussed in favourable terms next to renewables.

More over **other** relevant **EU policies** have implicitly linkages to bioenergy:

- CAP: direct farm payments and set-aside policies notably. Non-food crops can be grown on set-aside land. There is also a premium for energy crops of € 45/ha.
- Blair House Agreement of 1992: the EU and the United States set a ceiling on the production of oilseeds for energy on set-aside land; this ceiling is equivalent to about 1 m hectares of oilseeds (Rabobank 2005:11).
- International trade agreements have an impact on the proportion of imported biofuels.

In summary, the synopsis of bioenergy-relevant strategies and objectives, which are proposed by the EU, serves as a basis for defining major scenario elements as well as finding a common vision on sustainability scenarios.

## 2.2 Facts on a possible future scenario for bioenergy

Within the process of bioenergy policies only a subset of above described objectives are currently implemented as legal directives and laws. Taking the policy strategies into account the state-of-the-art with corresponding current tendencies and outlooks will be summarised in the following chapter.

### Biofuel

The EU is the world leader in **biodiesel** production, which is predominately derived from rapeseed. As biodiesel is the most important biofuel in the EU and the biofuel obligation is already implemented at national level the production of biodiesel will gain certainly importance. There is a non-binding goal (EU Biofuels Directive) which sets 5.75% of transportation fuels to be comprised of renewable fuel by 2010. In 2004 only 0.7% of total diesel consumption was biodiesel and in 2005 the total production of biodiesel was 3.2 million tonnes (F.O. Licht 2006), equivalent to 2.75 Mtoe. The Rabobank (2005:18) expects that biodiesel consumption will rise to 4.4 Mtoe by 2010, or 2.6% of the total consumption.

Assuming that the fuel prices are rising towards 2025 alternative bioenergy production becomes comparatively more advantageous. The obligation of 5.75 for biodiesel production might be fulfilled for the total biodiesel consumption and / or ethanol. As half of the EU member states like **France, Germany, UK, Italy** have already adopted the goal and are progressing well, the infrastructure for biodiesel production will increase comparatively higher in these regions than in remaining member states, where is still little interesting for biodiesel production (USDA 2006). In this case the production structure (and thus also landscapes) would change with regional concentration of rape production, thus at the level of production centres the diversity of crops might decrease. Secondly, those countries which have huge resources in production of rape will presumably catch up in order to gain from the bioenergy trend. As major countries the **Czech Republic** with 12 % and **Poland** with 8 % of the total rape production will increase rape production as well as related establishing of a production infrastructure for biodiesel production. Generally, the fewer the 'concentrated' rape production in member states the less possibilities they have to participate and invest in biodiesel production.

### Ethanol

The total production of **fuel ethanol** in 2005 was 750,000 tonnes, or 458,000 tonnes of oil equivalent (F.O. Licht 2006). **Spain** and **France** are the major producers (Rabobank 2005:36). Both production and processing capacity are rising fast, and the Rabobank projects that the EU-25 will consume 3.1 Mtoe of fuel ethanol by 2010 (ibid.:14). Starch crops

such as wheat and sugar beet provide the raw material for bioethanol as a petrol substitute. This leads to the fact that food and non-food production are in high competition. The prices will increase due to higher demand, because supply will presumably not increase the same. Again, as in the case of biodiesel, the differentiation of the production structure be more diverse, concentrated production will take place and bio ethanol will be produced mostly in Spain and France and in lower quantities in Sweden.

The price structures, food demand in Europe and world-wide leads to the fact that the increased demand for biofuels will be partially met by reducing food production from potential biofuel crops. The **agricultural land** under crop production is likely to increase (EEA 2004). Studies indicate that biofuel crops would take up between 4 % and 13 % of the total agricultural area in EU-25. The given range depends on the choice of crops and technological development, if the 5.75 % target of the biofuels directive is to be fully met and all crops are home grown (EEA 2004).

In a **global and long-term perspective** the above tendencies are evident, but high insecurities on estimating towards 2025 exist. Brazil is contributing about half of the world bioethanol production, with US following next. The European Union, with a production of about 0.5Mn tons, is estimated to be accountable for about 10% of the total Bio-ethanol in the world. But it is evident that Brazil will export higher quantities and also the EU will produce with high yearly growth rates. The **(1) worldwide price/cost schemes, (2) the world trade agreements (non-tariff barriers)** as well as **(3) global energy demand** are to consider as major influencing factors for scenario perditions on transport fuels within the EU the development of.

## Biogas

Biogas can be used in the same way as natural gas, as liquid fuel in vehicles, heater generating electricity. The joint production of heat and electricity is an efficient way of utilizing biogas potential, but only possible in areas near urbanisations.

The largest producers of **biogas** at present are the **UK** and **Germany**, with respectively 1.5 and 1.3 Mtoe in 2004 (EurObserver 2005). Smaller quantities are produced in **Spain, France and Italy**; together these five countries account for 84% of all biogas in the EU. Growth in biogas production has been below the rate required to fulfil the 2010 target of 15 Mtoe. However, it is expected that further improvements in technology may lead to much larger quantities of biogas over the next two decades (EEA 2006:26).

In UK and Germany a determinant policy set incentives for biogas production, which are processed to electricity with occasional additional use of heat. This policy instrument set incentives in both regions with high supply of manure as well as (mostly) regions with maize cultivation. Therefore the local production of biogas will take place most likely in those regions where to find both production inputs at the same time. This also lead to increased agricultural land under crop production.

Biogas has a **regional / local long-term perspective** since biogas is economically not transportable for long distances. The above described tendencies depend very much on national policies, are evident, but high insecurities on estimating towards 2025 exist. This depends on the currently existing character of support systems as **(1) feed-in tariffs, (2) green certificates and tax incentives, green certificate system and (3) the systems based only on tax incentives**. Depending on the system the affect of widely spread small-scale systems (like Germany) or concentrated large-scale production will take place. However, the the **MS UK Germany, Spain, France and Italy** as well as to lower extend **Denmark** and **Austria** will be in absolute terms contribute significantly in 2025 to the

biogas production. This will lead to also significant changes in land use, such as maize production. Presumably this policy option will not affect significantly the increased of agriculture land, since due to manure use the production takes place where land and animal production is characterised mostly in intensive production regions.

### Wood and heat

The final use can be as transport fuel (ethanol or compressed biogas), heat or electricity (whether alone or co-fired with other fuels such as coal). Heat at a household or district scale is probably still the major use, but electricity is important too: in 2004, the capacity of woodfired power stations in the EU was 7,800 MW, about 1% of total generating capacity. This represents an increase of 70% compared to 1995 (Eurostat). The increase of energy production from wood in general is more modest: 31% over the same period. The largest producers of wood energy in absolute volume are **France, Sweden, Finland and Germany**; however, in relation to its size **Austria** is also a major producer. **Spain, Poland and Portugal** also produce large quantities of wood energy (EurObservER 2005). The change in land use will be relatively small due to the time horizon of only 15 years (target year 2005). Moreover, the use of residues will proportionally higher than felling and currently the feedstock wood is in the EU abundant. All these facts are relevant, but affect only a slight increase of **forest land**.

## 3 Essential elements of sustainability for bioenergy

Taken the described objectives of chapter 2.1 into consideration the essential scenario elements can be derived on both, the available policy instruments at the level of EU and the herewith provided content-related issues for developing sustainability scenarios. The question to answer is **'Which essential elements of sustainability that are integral part of the vision can be defined for the purpose of developing sustainability scenarios?'**

### 3.1 Essential elements

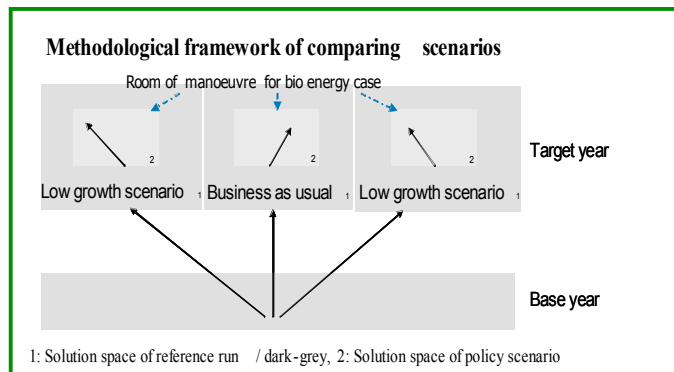
Having revised the given policy aims for bioenergy the instruments which the Commission wishes to use, can be summarised as follows (see table 2):

Table 2. Policy instruments for promoting bioenergy

<i>Carrots</i>	<i>Sticks</i>	<i>Sermons</i>	<i>Information</i>	<i>Research</i>	<i>Institutions</i>
Reduction of excise duty for biofuels	Compulsory percentage of biofuel in transport fuels	Work with NGOs and local authorities	Set up networks for communicating information in the fields of technology, finance, and environment	On supply chain	Adapting regulations to remove barriers to bioenergy use
Subsidy for energy crops		Institute awards	Organize conferences	On efficiency of production	Standardization and labelling of products
Support to investment				On reducing negative environmental effects (solid waste)	Trade agreements on biofuels
Promoting use of surplus forest growth for bioenergy					
Promoting use and modernization of district heating					

SENSOR uses a **multifunctionality approach** in order to build an operational framework for sustainability scenarios. By using sustainability indicators non-commodity outputs (NCOs) and commodity outputs can be considered at the same time. For this the connection from policy instruments to land use changes and subsequent from land use changes to sets of indicators have been design in a model approach. The two major components 'Scenario components' and 'Indicator functions' will be explained therefore in the following:

In this regard the **ex-ante scenario development** is key for plausible and reliable scenario results, which decide on the success of model acceptance at EC-level. The model SIAT simulates results for the target years 2015 and 2025. The scenario methodology consists of three variations of reference scenarios. Each of them determines a specific model solution space, in which the policy cases can be simulated. The reference scenarios comprise 3 constellations of 5 driving forces: oil price, labour participation population (number), research & development as well as world GDP. The business as usual is considered as the no-change baseline, of which all considered drivers are adjusted to the 'current trend' values at the level of Member States (EU25). In case of the high and low growth reference scenario all drivers are assumed to a general positive and negative future development respectively. In terms of consistent analysis it is important to project the policy impacts against the results of the reference scenario of the same target year 2015 / 2015. The policy objectives have been translated into the following relevant EU-policy instruments:



- Liquid biofuel obligation with policy target '% of total transport fuel' (biofuel obligation)
- Biogas and heat used for electricity production (subsidy on electricity / supply guarantee)
- Import tariffs with combined import quotas for fuel (world trade agreement)

### 3.2 Vision on sustainability scenarios

Impacts are measured by a SENSOR sustainability indicator framework. The set of impact issues in the environmental, social and economic sustainability dimensions define also the base for defining the vision of sustainability scenarios. Each impact issues define a set of specific indicators. With regard to agricultural and rural policy perspective the **vision on sustainability scenarios** affects eminently the highlighted impact issues to be stressed in scenario building:

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#### *Social dimension:*

##### **SOC1: Employment and labour markets**

SOC2: Standards and rights related to job quality

##### **SOC3: Social inclusion and protection of particular groups**

SOC4: Equality of treatment and opportunities, non-discrimination

SOC5: Private and family life, personal data

SOC6: Governance, participation, good administration, access to justice, media and ethics

SOC7: Public health and safety

SOC8: Crime, terrorism and security

SOC9: Access to and effects on social protection, health and educational systems.

SOC10: Tourism pressure

##### **SOC11: Landscape identity**

##### **SOC12: Migration**

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#### *Environmental dimension:*

##### **ENV1: Air quality**

**ENV2: Water quality and resources**  
**ENV3: Soil quality and resources**  
**ENV4: The climate**  
**ENV5: Renewable or non-renewable resources**  
**ENV6: Biodiversity, flora, fauna and landscapes**  
**ENV7: Land use**  
 ENV8: Waste production / generation / recycling  
 ENV9: The likelihood or scale of environmental risks  
 ENV10: Mobility (transport modes) and the use of energy  
 ENV11: The environmental consequences of firms' activities  
**ENV12: Animal and plant health, food and feed safety**

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*Economic dimension:*

**ECO1: Competitiveness, trade and investment flows**  
**ECO2: Competition in the internal market**  
 ECO3: Operating costs and conduct of business  
 ECO4: Administrative costs on business  
 ECO5: Property rights  
**ECO6: Innovation and research**  
**ECO7: Consumers and households**  
**ECO8: Specific regions or sectors**  
 ECO9: Third countries and international relations  
 ECO10: Public authorities  
 ECO11: The macroeconomic environment

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Source: SENSOR 2006.

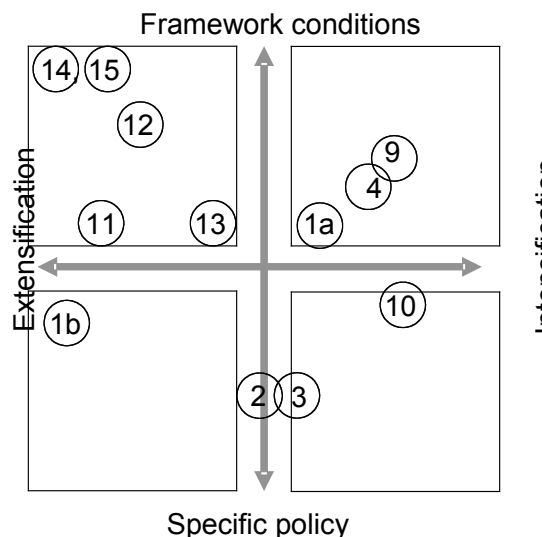
A "desired" future scenario should emphasis on balancing positive effects in the high-lighted issues. This prioritisation of "sustainability" issues is a containment, however SENSOR is not pre-defining "desired scenarios", but simulates currently in the policy debate discussed instruments. The current policy framework of the CAP provides a bunch of instruments to cause positive effects within the above described impact-issues.

#### 4 Conclusions: Translation of bioenergy objectives and potential impacts

The concluding chapter tries to answer the question on 'How can current policy objectives of topic complexes be translated to match with the objectives sustainability scenario?' Within the agricultural policy framework major tendencies are (1) decreasing domestic support (direct payments), (2) increasing market access (WTO) and (3) step-wise reduction of export quantities. Increasing funding will occur on WTO-conform green-box measures, in particular in connection to diverse locally applied policy instruments at the level of states. With regard to bioenergy objectives (see 2.1) the highly relevant policy instruments have been worked out (see 3.1) and for this purpose relevant issues to be addressed have been illustrated. As a final conclusion the translation of bioenergy objectives into policies will be summarised:

		<b>CAP</b>	<b>Renewable Energy Directive</b>	<b>WTO</b>
(a) Liquid bio-fuel promotion and obligation with policy target % of total transport fuel'	Product: Biodiesel Ethanol Input: rape, cereals	<b>1a</b> direct farm payments <b>1b</b> payments for set-aside <b>2</b> Non-food crops can be grown on set-aside land <b>3</b> premiums for energy crops of € 45/ha <b>4</b> % of biofuel of total fuel consumption		<b>14</b> Import tariffs <b>15</b> import quotas for fuel (market access, Import tariffs)
(b) Biogas and wood (heat) used for electricity production	Product: Biogas, Electricity, Heat Input: wood, manure, cereals (mainly maize)	<b>5a</b> direct farm payments <b>5b</b> payments for set-aside <b>6</b> Non-food crops can be grown on set-aside land <b>7</b> premium for energy crops of € 45/ha	<b>8</b> Regulate preferential access of renewable energy to electricity networks; <b>9</b> Tax reduction or exemption; <b>10</b> Favourable tax rates for investment in renewable energy; <b>11</b> Further promotion of technological research to increase competitiveness; <b>12</b> Allow state support to renewable energy; <b>13</b> Incorporate renewable energy in existing programmes (e.g. rural development)	

Considering the relevant policies to promote bioenergy the classification scheme in the figure below explains qualitatively the **impact dimension of the currently applied policies** that are connected directly or indirectly to the thematic area of bioenergy. In this regard the table shows a classification between impacts on (a) a more intensified production of feedstocks (e.g. rape for biodiesel, maize for biogas etc.) and (b) a characterisation of the instruments itself, whether the applied policy instrument is specifically design for detailed biofuel promotion (e.g. subsidy on renewable energy) or whether general policy framework conditions affect bioenergy production within the EU (e.g. WTO tariffs, import quota). Latter implements EU-measures at the level of member states with nationally designed policy instruments.



Of course the **impacts** vary in intensity across **regional scales** as well as across **differently applied policy** designs to promote bioenergy (in case of general EU-measures), thus this figure gives a rough classification. Reference of those potential policy impacts is non-existence of policies for bioenergy promotion. According to the classification the (1a) direct farm payments intensify only moderate because of the new system of average farm subsidy, the payments for set-aside extensify tremendously agricultural production, but with (2) allowing to cultivate renewable crops on set aside the specific policy affects or leads to moderate extensification, because e.g. non-food rape is grown at low costs (comparatively lower input). Due to higher incentives the (4) biofuel obligation also affects towards an intensified cultivation, but it is unspecified in terms of production (feedstocks could partly be also imported). (9, 10) Tax exemptions promote bioenergy at processed level and lead to comparative advantage and thus intensified production of renewable crops. The three further policies (11, 12, 13) extensifies mostly the bioenergy production because accelerating technological processes leads to less input compared to given output units. They are all generally defined, but distinguish in potential impact on extensification. The WTO-agreements are considered with number 14 and 15. These define the framework conditions, but have in case of a successful liberalisation a tremendous impact on extensification (e.g. higher bioethanol import).

**In summary**, a methodological framework is provided, in which a set of existing policy objectives as defined at EC level are analysed in front of global trend scenarios: Through the linkage of resulting changes in economic frame conditions to consecutive land use changes indicator analysis can be conducted to anticipate possible sustainability impacts at regional scale. In combination with trade-off analyses, this approach could support the envisioning of sustainability scenarios in the bioenergy context.

## References

European Commission, 1997: Energy for the Future: Renewable Sources of Energy; White Paper for a Community Strategy and Action Plan. Communication from the Commission, COM(97) 599 final (26/11/1997).

European Commission, 2001: Communication on alternative fuels for road transportation and on a set of measures to promote the use of biofuels. Communication from the Commission, COM(2001) 547 final (7/11/2001).

European Commission, 2001b: White Paper - European transport policy for 2010: time to decide. Luxembourg: Office for Official Publications of the European Communities.

European Commission, 2005: Biomass Action Plan. Communication from the Commission, COM(2005) 628 final (7/12/2005).

European Environment Agency (EEA), 2006: How much bioenergy can Europe produce without harming the environment? Copenhagen: EEA Report No. 7/2006.

European Commission, 2006: Environment, Sustainable Development, <http://ec.europa.eu/environment/eussd/>.

F.O. Licht, 2006: World Ethanol and Biofuels Report 4:17.

Organisation for Economic Cooperation and Development (OECD), 2006: Agricultural market impacts of future growth in the production of biofuels. Working Party on Agricultural Policies and Markets. AGR/CA/APM/2005)24/FINAL. Principal author: M. von Lampe.

Rabobank, 2005: Biofuels in the EU. Changing up gears. Utrecht: Rabobank International. Authors: S. Hansen & M. van Vaals.

European Commission, 2006: A European Strategy for Competitive, Sustainable and Secure Energy. Green Paper, COM(2006) 105 final (8/3/2006).

United States Department of Agriculture USDA (2006): Biodiesel Demand Continues Pushing Rapeseed Area Up In The EU, commodity intelligence report, (202) 690-0138 USDA-FAS-CMP-PECAD

Bharat Book Bureau (2006): Biofuel Market Worldwide - Brazil has become world's leading producer of Bio-Ethanol, collection of business market research reports, India.

EEA (2004): EEA briefing, Transport biofuels: exploring links with the energy and agriculture sectors, EEA.

Gothenburg Summit (2001): GÖTEBORG EUROPEAN COUNCIL, 15 AND 16 JUNE 2001, SN 200/1/01 REV 1.

# Vine, Grape & Wine elaboration in European Union - Perspective and durability, the French experience

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## **Main Fields of experience**

Industrial Economics and Economics of Governance applied to the Agro-Food sector  
Project Management & Biotechnics Research of the Vine and Wine sectors

Not specialised in the Sustainable Development issue, we are mainly interested by this topic to introduce new indicators of social welfare in our diverse Research projects, especially in the projects related to environment and employment in French agricultural commodity chains. Challenged by Bordeaux and Burgundy growers associations, we have developed a Research project on grapevine integrated-management (impact of vine growing on environment and landscape). Because of the specific character's of the grapevine sector (intensive cropping, periurban location, cultural quality attributes) and also because of the similarities with other crops like fruits and vegetables, it would be interesting to develop more Research on Sustainable Development (SD) in this sector which could be an example to design a device for the sustainability of the quality food sectors in EU.

## **1. Introduction to the sustainability of the wine sectors in European Union**

The characteristics of vine growing (very intensive cropping, strong social embeddedness) make this commodity chain a completely relevant model to analyze, in order to test the methods of durable production in a both agricultural and “artisanal” sector. Our work is based on different prospective studies and a more general work of the French National Institute for Agricultural Research on SD, completed with personal communications with our network of researchers and industry delegates. We propose an analysis in three parts: first the driving forces, then their impacts and, third, the most probable scenarios of restructuring of the current “vine and wine” systems.

### **1.1.1 Mains figures of the economic situation**

The total area in vine in the EU is 3.5 millions hectares (8,6 10<sup>6</sup> acres). It is not the main crop area, but its economic importance is sizeable, in particular in the Mediterranean area, from North to South. Due to the importance of the EU in the world wine production, the policy objectives of the European Commission is to regulate the production by a strong control of the vine land. This is not without consequences for its development. The edaphic heterogeneity of the vine location allows the observer to make multiple comparisons in regard to the constraints and evolutions of the technical practices. Last but not least, the historical differences in commodity organization and institutional environment bring us a interesting model to observe the evolution of social parameters in term of employment and working conditions.

The dramatic fall of consumer demand in Europe, combined with losses of export markets, has legitimated policies aiming at reabsorbing the ordinary wine surpluses. The policy of reduction of supply reduction by the vine pull scheme led since 1987 has hardly affected the surface of the ordinary wine vineyards, which is spread all over Southern Europe, from example in France, from Provence to the Atlantic cost. Important troops of exploitations, in particular in the smallest sections of surfaces, have disappeared, without result in the objectives of outputs reduction. The growth potential of the vine productivity, was and remains important, what returns inefficient the policies of this type. These vineyards however were restructured, thanks to the EC program and to national public supports: they produce today mostly wines under Geographical Indication (GI) with higher values.

The combined impact of the regression of the demand and the pulling policy was amplified by a group of important social and financial factors. The absence of farm successors, due to an inherent form of rural life insulation and the painfulness of work, has been as much decisive as public policies in the fall of vine estates. The residential conversion of vine blocks located in periphery of towns and cities, or offering gravitational agricultural alternatives, accelerates the dismemberment of a number of estates. Problems of financial management and the absence of setting in prospect for the expenses associated with the recovery or the transmission worsen the situation of some young people. The period of euphoria in the “varietals” market at the end of the 1990's has pushed numbers of new farmers to invest much more than they have to do; so they contracted huge debts. The fall of the bulk wine market which followed, with no sign of recovery, put them in such difficulty that a significant number of them finally sold their vineyard. Lastly, land concentration (with the detriment of the successions) is accelerated by the good capacity of investment of the great estates. Nothing in wine economics data shows a possible inflection of the trend. One cannot consider a deceleration of the reduction in the number of businesses, nor either an era of stability of the functional forms of the technical practices. Questions remain about the evolutions of the French wines markets. Overall the ¾ of harvest marketed in the France could be threatened, excepted certain types of wines, red table wines, brandies, the export trends in the context of [a strong dollar and of fast substitution of the origins by the foreign distributors is much more random. The stochastic one of becoming various forms of vine growing will depend in very great part of relevant points of anchoring to the glance of dynamic local.

This pessimistic picture of the future of the wine sector has found an echo in the Commission proposal for a Wine CMO reform. But, in fact, few changes compared to the former politics (since 1987) are proposed and sustainability considerations have been excluded from the debate. The main orientation of the proposition is always a quantitative regulation with a reduction of the viticultural area. During the wine seminar in Brussels, 16<sup>th</sup> February 2006, this point was the main elements of the debate. It was also true for the workshop 2 debate on “How to achieve a sustainable European wine policy?”.

### 1.1.2 Looking for indicators of vine sustainability

For a better understanding of vine sustainability, we started with an INRA “expert analysis” on agriculture sustainability prospective. Then we used the IDERICA approach of sustainability, which is a generalization of the Farm Sustainability Index (IDEA), a method based on direct surveys<sup>1</sup>. IDERICA uses the French Farm Census and the economic accounts of the Farm Accountancy Data Network (FADN). With this method, researchers can make comparisons of sustainable development indicators between regions or between types of farm (OTEX)<sup>2</sup>, at a reasonable cost (Girardin & al., 2005).

On the 41 IDEA indicators, 26 are calculated in IDERICA with or without particular adaptation; 15 are not calculable due to the lack of usefulness of data available in the Census and FADN. The IDEA method is structured in 3 sustainability scales subdivided in 3 or 4 components (see details in table n°1). If all the economics indicators are calculable with the FADN data, the main limits of the studies are in the lack of indicators on biological systems or based on farmer’s perceptions (e.g. quality of life, insulation, intensity of work).

So, 15 of the IDEA indicators are not calculated in IDERICA, A3. crop biodiversity, A5. valorisation and conservation of the genetic pool, A7. fields dimension, A9. areas of ecological regulation, A14. liquid waste processing, A16. animal welfare, B2. building and landscape valorisation, B3. non organic waste processing, B4. space accessibility, B8. employment contribution, B12. training, B13. work intensity, B14. quality of life, B15. insulation, B16. hygiene and safety.

Table of comparison of the IDEA and IDERICA indicators

scale	components	Indicators numbers IDERICA	Indicators numbers IDEA
Edaphic	Diversity	3	5
	Space distribution	5	7
	Agricultural practices	5	7
Social	Food quality & terroir	7	5
	Employment & services		5
	Ethic & sustainability		6
Economics	Economic viability	2	2
	Independance	2	2
	Transmissibility	1	1
	Efficiency	1	1

<sup>1</sup> IDEA : Indicateurs de Durabilité des Exploitations Agricoles

<sup>2</sup> OTEX : Orientation Technico-économique des Exploitations

The examination of the most significant indicators for vine-growing farms has given results that are more mixed than our network of expert's conclusions.

Indicator n° 9 : biodiversity

Both wine OTEX have bad scores because vine is a perennial crop. Biodiversity is certainly in danger in vine fields, but the measurement of his evolution had to be more precise. The random results on the phenotypic characters of the grape obtained by sexual reproduction have conducted the vine growers to make a "wood reproduction", which has conducted to a huge reduction of the genetic diversity of the vineyard. But it is not a new phenomenon: the main varieties have been selected 100 years ago, and, after the phyloxera crisis, some of them (like chardonnay, one of the most diffused varieties in the world) where certainly reproduced about 3 or 4 plants (see Merdinolglu for more information about the intra-variety genetic diversity).

Indicator n°19: sustainability of the soil resources

Both wine OTEX have bad scores due to the cultivation practices of that crop. The difficulty there is that we have no information about the importance of the problem in the diverse location. The situation is similar for all the area. The importance in the plain areas are not measure relatively to the impact on the hill or mountain areas.

Indicator n°18: pesticides

Both wine OTEX have low scores (~0 for a huge proportion of the sample). The question there is that, if we consider the pest treatments, the real cost is a combination of inputs bills and advertisements. Due to the complexity of the techniques, the most expensive techniques is not necessarily the one with the lowest cost. For example, the prescription for a transition to organic or to integrated farming could be expensive.

Indicator n°20: sustainability of the water resources

Both wine OTEX have good scores due to the low water requirements of grape production and the prohibition of the irrigation by European and national laws. Like others indicators based on financial costs, it could be an appropriate indicator with interesting results for a rudimentary trans-crops benchmark. But there are sharpness needs of individual evaluation of each indicator.

Indicator n°30: collective work

Both wine OTEX have low score: that makes us wonder about the pertinence of the indicator, because we know that wine producers are embedded in complex networks of cooperatives and grower's associations to share important know-how and geographical indications.

### 1.1.3. Indicators of S.D. in agriculture, questions and propositions

The lack of a pertinent survey on the evolution of the diverse aspects of agriculture development shows a gap between public policy goals and their concrete application. Indirect measurements of indicators reveal a poor governance in this area. In the Research analysis of the law and rules studies on the SD these deprives are patents.

As a first suggestion, we recommend an investment of the UE Commission and member States on an appropriate survey, with S.D. pertinent indicators. There is real need of information in four subjects. **We suggest a four-part European agricultural survey**, with a 3 years periodicity with the tenth.

- structure (ES): land, cattle, crops, workers, machine, main activities
- activity (EA): a complete information on backward and forward activities (*its is missing in the actual system of information*)
- financial result (FADN): with a more detailed and reliable information
- sustainable development index (SDI): edaphic and social survey for an evaluation of the evolution of the diverse parameters and behavioural changes (*the implementation of*

*that survey could be in charge in France of the Agricultural Chambers as a part of their public service)*

## **1.2 Mains debates and questions on negative and positive externalities of the vine and wine sectors in France**

### **1.2.1 Pest treatments major interrogations for the future**

Due to the sensitivity of the grape, the foliage and the wood to a wide number of pathogens the use of chemicals in wine production is intense. The protective strategy is one of the most intense in agriculture. When weather conditions and pathogens pressure are at the highest the number of treatment could be of 15 or more. The residuals are generally toxics and non immediately bio-degradable. That implies a resonance of pesticides treatments on ground water, and also of fertiliser who are frequently use in excess.

The importance of vine area in France and the weight of sanitary protection are directly responsible of the fourth France position in the world of PPP users. The current technical trajectories of the vine growing have a strong negative impact on the quality of water, the erosion of the grounds, the amenities landscape and biodiversity. While the EU own a wide range of situations the main fact in viticulture, is the concentration on a small area (12 % of the total agricultural employment, for 3 % of the total area). soils erosion, etc. Implications for the future of vine growing and is location are multiple.

In the definition concerning the front of science to develop, the vine research is one of the most excitant and with the highest uncertainty<sup>3</sup>. The vine researchers would be confronted in the next 20 years to preoccupant development of fungus and insects resistances. Complex crop, the vine is not necessarily a simple model for physiologists to understand the natural defence process of the plant. The genome is important and like in other lignose plants the environment could have a huge impact on the activation of the diverse mechanisms.

Actually the vine growers use 50% of the total weight of pesticides whereas the area is only 3% of the total area. These weight is due mainly to the direct incidence of the disease not only on the volume of the crop, but also on it's incidence on the wine quality and consequently on it's price. The low financial pressure on the producers, the pest cost of the treatments is on average 5% of the total cost is the second explanation. Whereas the development of integrated pest management techniques, the improvement of the materials, the exclusion of an important numbers of molecules the reduction of the chemicals use is not really significant during these last years.

### **1.2.2. A major part of the French inheritance, the Vine landscape**

Landscape amenities are an increasing subject of attention. Recent studies based on hedonic prices measurements reveal the important place of the green places for the urban centres. In the French wine sphere, the landscape amenities have been a important argument during some debates about the technological evolution of the Champagne or Beaujolais AOC. These question take also an important place in the schedule of the reorganisation of town close to important vineyard like Montpellier or Bordeaux. More precise knowledge about the insertion of

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<sup>3</sup> Prospective vigne & vin - microscenarior Msc 7.1 "The world vineyard is hill" (p. 202)

the vineyard in peri-urban areas and about the political management of the vineyard inclusion in the urban development would be given by the PhD thesis of Stephanie Peres in the Bordeaux urban dynamic.

Concerning the vine fields, an important work has been made by the Technical Institute of Vine and Wine for a census of the different forms of vine landscape in France. The question there is how do the vineyard can resist to the urban extension when the building land prices are fourth or tenth the price of the best vine lands.

## 2. Capacity of the social control to direct the development

The evolutions in term of use and structures of exploitations are fundamental to include/understand the anthropic rejections. Significant differences, which are much more than nuances exist between the 12 great French wine areas and make it possible to illustrate almost the totality of the situations present on the EU territory. Our intervention makes it possible to emphasize some of the social consequences of the transformation of the operating systems.

The economic perspectives for the wine farms can be read only in comparison with the development of the territorial devices and institutions which surround them. A first approach of the farm's position is possible starting from meticulous analysis of the diagrams of division of the labour on suitable scales. The regional statistics reveal a plurality of firms and commodity chain organizations which confirm that the French vine growing can be conceived only as the sum of more or less partitioned regional dies, droved by economic modes of operation relatively distinct, of which testifies precisely various thresholds to functional rupture. The distribution of work between firms categories characterizes local forms of organization which report us to a draft models delimited by territorial memberships in extreme cases more or less wide. Subsets, areas rows with administrative or *interprofessional* governance but smaller wine-growing zones too, have logics of specific organization in resonance with particular functional diagrams. One of the most important resources for the sustainability of the wine sectors reside in the variety of these schemes of social distribution of the work. These variety is firstly a direct sources of social diversity and a factor of resistance against the concentration of the sector, concentration generally correlated with the decreasing of employment. It is secondly links to biodiversity. Agronomic practices are related to edaphic situation but also to social device. If the research knowledge between both is still insufficient, the relation is established by experts observations. The future of both subjects, social and edaphic diversity, have common runs.

*We can consider that the most important resources of the wine sectors, as for others crops, are the diversity of practices and territorial organisations as much as genetic resources.*

The first models of wine commodity chains could be ordered by the proximity between the actors, in reference to the marshallian industrial district relationships. Two major models could be describe:

- In the first model, exchange and works associates vine growers to merchants in contact with the urban markets;
- in the second model, flows are much more cut : grape growers where gathered in co-operatives of wine making and of the tradesmen similar or distinct from the merchants above. In these diagrams of vertical relations, the vine growers or the co-operative marketing of the wines in bulk could be meet today more or less in all the French vineyards. The co-operatives of wine making, subsidiarily have functions of conservation of stocks and shutting of qualities on which they put forward a capacity to carried out economies of scale. Their relations with the trade-stockbreeder evolves/moves, at the same time as they develop commercial activities and technical

with trade undertakings external with the area, in particular with the distributors of the EC principal markets which are provided more and more directly in the vineyards.

In response to specific technical and marketing constraints appeared more and more particular local commodity chains circumscribed with a vineyard. For examples : The importance of complex technological parameters at all the stages of the development of Champagne induced the early transfer of the raw material of the wine grower to the brand companies on the traditional agro-food vertical organization. The Champagne schedule correspond to the most widespread model in the wine sphere. Comparable with the model grape-growers/winery (viticultor/bodega) of Australasia, California or Spain, it associates raw material suppliers and firms specialized in transformation and marketing. In Bordeaux, the model is different, the principle of indication of quality is closely associated to the identity of the wine producers.

Strongest interrogations concerned the vertical relations between vine growing and trade, and thus the problems unit of collective organization, are posed by the situations where the relative market share of the producers becomes high. In this case vertical competition between growers and merchants can induced a market power likely to rebalance the positions of the various partners in the commodity chain and improve the distribution of the added value; but it also exacerbate the relations at the point to stop any search for consensus, step however essential when it is a question of managing shared credits, a collective mark or joint investments. This situation of strong extension of the growers on commercial functions, is amplified in the Burgundy example. The downstream vertical integration by the grape and wine growers allows them a control of the externalities of the AOC reputation. The variety of the offer authorized by the differences of the technical practices, to the vineyard and in cellar, from relatively independent manufacturing units goes in the direction of the demand of the most informed consumers and approaches an optimal model of differentiation of the offer.

This model of organization tends towards an improvement of the farmers constituting the whole of the community involved in the GI. The generalisation of the communication supports accessible to small manufacturing units half-opens the doors of a possible development of these agrarian forms which has gone against the evolutions of the agricultural functions for two centuries. The growth towards the downstream market of the vine growers activity remains in spite of the retail companies evolution. To maintain their position in the distribution networks of quality wines where the major players concentrates, producers have to increase their offer. But will a vertical and horizontal extension of small units with limited financial capacities be compatible with the modern markets requirements in a long-term perspective?

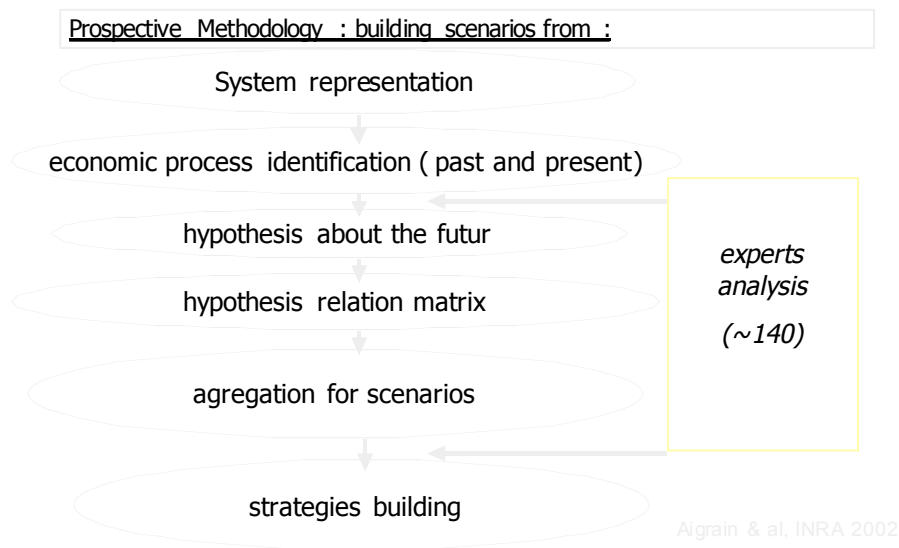
The social control of the development of the activities in the wine sphere were firstly managed by the producers whereas the public authorities have imposed rules and subsidies. The challenge is now to build a new policy able to help the producers to resist to the pressure of the market in term of costs and to a new demand in term of quality and logistic.

### 3. Scenarios framework for the Sustainability of the Vines and Wines Sector

We formulate proposals on the probability of perennial or development of various technical options in order to circumscribe 3 prospective scenarios of the establishment of modes of governance of the vine sectors. The consequences on grounds, landscape amenities, employment and models of organization are discussed.

#### 3.1. The Vine and Wine Prospective Studies

The INRA Direction for Prospective and Analysis was in load to realised a study about the possible futures of the Vines and Wines sector in France. The command of the Head direction was to produce a document for the management of a research and business policies. This work was conducted in 3 times



- The first realisation of the prospective methodology is a representation of the economics process at work in a complex environment. The representation wax build on 4 different plans:
  - i. a plan products flows,
  - ii. a plan actors,
  - iii. a plan rules/laws,
  - iv. a plan of financial flow.
- The second realisation is an identification of the economic process and the hypothesis about the future. 107 key drivers were selected on a pack of 700 hypothesis by 3 panels of experts (for a total of 140 experts).
- The third realisation is the conception of scenarios about a future of the sector. Different groups of scenarios were built in accordance with the major interest of the studies conducts.

Among the list of keys drivers 9 groups of scenarios were selected to describe the different possible futures.

### 9 groups of microscenarios

1. Distribution channels
2. Financial structure of the Wine production
3. Wine and world governance
4. Public health face to wine and alcohol
5. Quality signals
6. Who's the research pilot?
7. Sanitary diseases
8. AOC, technics and labels
9. Public interventions in EU with 25 members ?

Aigrain & al, INRA 2002

For each group of scenarios a list of keys drivers was establish to lead the analyse on the possible opportunity of each element according to the hypothesis on the probability of possible events.

Group of MicroScenarios	Key drivers
1. Distribution channels	<ol style="list-style-type: none"> <li>1 The biggest cooperatives trade with national brands</li> <li>2 The <i>negociants</i> produce on demand specific wines</li> </ol>
2. Financial structure of the wine production	<ol style="list-style-type: none"> <li>1 The New World Wine Producers decline</li> <li>2 Coexistence of wines <i>terroirs</i> and industrial melting wines</li> <li>3 Industrials assemblies without GI</li> <li>4 GI as strategies for NWWP               <ol style="list-style-type: none"> <li>4.1 GI is just a garanty for the provenance of a grappes majority</li> <li>4.2 NWWP have a aggresive strategy in Europe</li> </ol> </li> </ol>
3. Wine and world governance	<ol style="list-style-type: none"> <li>1 IOV is the major director of the wine world</li> <li>2 Weak mondial governance and strong protectionism in EU</li> <li>3 Wine, a commodity as another</li> </ol>
4 Public health, wine and alcohol	<ol style="list-style-type: none"> <li>1. Budgetary sanitarism and constraints</li> <li>2. Health public sanitary remains diversifies</li> <li>3 In the food planet, alcohol become the last poison</li> <li>4 Medical food regims</li> </ol>
5. Quality labels of the wine	<ol style="list-style-type: none"> <li>1. Flavours wine for wine bars</li> <li>2. The moment is the quality signals</li> <li>3. « Terra vitis », flavors and environment</li> <li>4. A « veritas » certification</li> </ol>

6. Who's the research pilot?	1. A private research arrange the territory
	2. Private research works for the bests regions
	3. Public research becomes highly regionalised in France
	4. Vine becomes the research orphans
7. Plant health stakes for the vine	1. The world vineyards is sick
	2. The link grape-wine is cut
	3. Occidentals consumers rejects technical evolutions for politics reasons
	4. researchers and consumers favourable to a genomic research

8.AOC, techniques and labels	1. AOC (and VQPRD) refuse GMO
	2. AOC integrate technical evolutions
	3. GMO are little used, and labelled, in accordance with bilateral agreements
	4. In a free GMO world, AOC hardly differentiate
	4.1 weak food fear
	4.2 strong food fear
9. Public intervention in EU with 25 members?	1. EU liberalizes its agricultural politics
	2. EU keep a quantitative intervention with eco-conditionality

The key hypothesis on demand is that the OCDE market trends are downward sloping for the next 30 years. Of course, new phenomenon on the demand, particularly the development of an Asian consumption could reverse the tendency, but evidences to sustain these hypothesis are weak. Due to the uncertainty on the influence of new markets, the major hypothesis of the *prospective* scenarios are based on a wine sphere with a constant perimeter.

A majority of the scenarios focus on questions about the institutional environment. The constant reference to these parameters indicates the importance of rules in the organisation of the markets for the future. If the actual policy device is not actually directly linked to sustainable development, some elements could be implemented by constraint related to.

### 3.2 Keys drivers for a Sustainable Development (or not)

Microscenarios consequences on Sustainable Development	In Favour	Unfavour
Msc1.1: Big cooperatives deals with national brands		(?)
Msc1.2: Negociant made on dem and wine	(?)	
Msc2.1: New world decline		+
Msc2.2: Coexistence of wines terroirs and industrial melting wines		(?)
Msc2.3: Industrials melting wines without GI		(+)
Msc2.4: GI as New World strategy with two variants		
-msc2.4.1: GI garanty a majority of the grappe origin		(+)
-msc2.4.2: GI is based on the European model (VQPRD)	+	
Msc3.1: OM govern the wine planet	+	
Msc3.2: Weak mondial governance and EU protectionism	+	
Msc3.3: Wine, a commodity as another		(+)
Msc4.1: Hygienism and budgetary constraint		
Msc4.2: Diversified public health policies		
Msc4.3: In the food planet, alcohol becomes the last poison		
Msc4.4: Medical Food Regimes		
Msc5.1: Wines with aroma copounds made for wine bars		
Msc5.2: The moment is the quality signal		
Msc5.3: « Terra vitis » Flavor and environment		
Msc5.4: A wine certified by Veritas		
Microscenarios consequences on Sustainable Development	In Favour	Unfavour
Msc6.1: A private research arrange the territory	+	
Msc6.2: Private research is made for the most famous regions		(+)
Msc6.3: Public research becomes more regionalised	(+)	
Msc6.4: Vine becomes the research orphan		+
Msc7.1: The world vineyard is sick		+
Msc7.2: The link grappe - wine is cut		+
Msc7.3: Occidentals consumers reject new technics for political reasons	+	
Msc7.4: Researchers and consumers are in favor of a genomic plant sanitary	(?)	
Msc8.1: AOC and VQPRD refuse GMO	(+)	
Msc8.2: AOC accept all technics		(?)
Msc8.3: GMO's are fire used and labelled	(+)	
Msc8.4: In a wine world without GMO, french AOC is pointed		
-msc8.4.1: AOC are between competitiveness and naturality	(+)	
-msc8.4.2: AOC used GMO		(?)
Msc9.1: EU liberalised is agrofood politics		(+)
Msc9.2: EU keep a quantitative intervention with eco-conditionality	+	

As expected, the experts grant a relatively important effect to the questions of governance in the sustainability development of the sector. The Microscenario's about public choices to manage geographical indications, research policies are primer factor for the organization of the

production. The development of the wine distribution network are also identified as keys factors relatively to the spatial distribution of the production units and value.

During the last two decades these factor's were the one's with the major impacts. The weak importance of the subsidies on the farmer's income (~ 0 to 5 %) defer the public choices on the quality governance and quantitative equilibrium to have a primer importance.

#### **4. Three main scenarios**

##### **4.1 First scenario: A sustainable development model for the quality food**

In accordance with the international governance, the International Organization of Vine and Wine (OIV), one of the major players of the wine planet, develop a interesting model of governance for a sustainable development approach in the international context. One of the most important element of the OIV politics is that the Codex Alimentarius recognise the rules defined by the OIV. The wine definition promoted by the OIV imposed to every state (resolutions ECO 01-08/2006) common rules. Practices recommended by the resolution CST 1/2004, considering the guidelines for integrated production in viticulture defined by IOBC, are takings into account as priority by the main producers. In spite of differences in the rules applications, enological practices are strictly controlled. Governments agree and promote a common process for geographical indication, the "Appellation d'Origine Reconnue", whereas the policies in the different states are not strictly similar. These political goodwill is of primer importance due to the opportunities the GI give to the growers association and the administration to promote new practices with relatively low transaction costs.

The GI reduce transaction costs and promote efficient schedule to manage the territorial development of the wine sectors in 4 mains directions:

- Land for quality wine protected area.  
The application of land regulation devices in urban areas, river and Atlantic and Mediterranean costs in France, stopped significantly the vine pulling up and preserved some of the most interesting landscapes of these regions.
- Control of the wine process and the obligation of exclusive grape use in the wine elaboration maintain the grape growers power of negotiation. The number of producers and their relative dispersion still remain high in most of the wine producing countries.
- Geographical Indication: Bonds between grape origin and denomination reduce the relocation and concentration of the grape and wine production in the most favoured agronomic regions.
- The AOR networks support the diffusion of the innovation process in favour of quality. The same schedule could be reused with environmental tools. The agreement of the vine and cellar could integrate an sustainable score as an essential condition.

##### **4.2 Second scenario: The wine is an agroalimentary product as another**

The ultraliberalism gains ground. European Union can not resist to political pressures against the perennial of the wine specificity. The abandon of the interdiction of the vinification of imported musts allows some firms to substitute raw materials to the EU grapes. What would be the choice of the wine origin? *The place of the grape production or the place of the last transformation (could be the place of the bottling).*

The area and the number of producers decrease dramatically.

The European Union authorizes techniques used in the rest of the world.

- The use of acids and wood ships reduce the consumer confidence in the wine. The wine public image is affected and the global wine consumption decrease. Wine prices

falls and the producers tend to reduce the attention to vineyard for less and less costly practices.

- Consequently the wine industry promote a business reorganization plan where wineries and marketers becomes more and more concentrated. The grape producers migrates in direction of the most fertile and cheapest zones. The fragile zones of production are left in waste land.
- The GMO vine authorisation imposed by the WTO affect the vine biodiversity. The high cost of the GMO selection (25 years & 3 millions euros) induce the use of only one variety in red and white wine. The limitation of the offer to the wines of Merlot and Chardonnay creates a repulsive effect which diverts consumers from the wine.

#### **4.3 Third scenario: A weak governance settles**

The WTA lose it's influence and no other sustainable development model become able to consolidate the OIV at an international level. In the first time, EU is in position to maintain it's non tariff barriers. The sustainable development labelling become a major tools for a limitation of the exchange. The national specificity of the labelling agreement induce markets fall. Each regional zone of exchange adopt it's own wine definition. The last limit of the wine composition is sanitary conditions. Bilateral agreements becomes the main drivers of the wine exchange conditions.

- The EU is able to define quickly political tools for a sustainable CMO Wine. Relative independence with regard to the international institutions make it possible the EU to propose concrete elements in favour of sustainable development.
- The consumers awakening of their impact on the taking into account of the environmental factors induced a fast development of the signs of certification. Majors certifiers enter in competition with the public organizations for the wine labelling. The trouble on the signalisation of the wine quality (in regards to organoleptic and DD scores) alter the product reputation.
- Law public investments in research in the vine diseases seriously threaten the continuation of the European vineyard. The high cost of vine maintenance decrease the consumer welfare and the commodity chain development.

## Propositions summary

- **A survey about sustainable development in agriculture**  
*A governance of the sustainable development could not be efficient without the elementary tools for a measure of the progress or the regression of the situation in regards to sustainable development.*  
A complete survey for an appropriate information about the evolution of the development of the agricultural sector have to be based on an adaptation of the method IDEA for a better evaluation of the sustainable level of the different crop systems; it have to include data about social welfare, working conditions, employment, quality of the product.  
These score have to be measured as well as the financial data concerning the income or the level of subsidies dependence or the farmer's income by specialised offices.
  
- **Research's about the policy effects on sustainable development**  
Ecology, working conditions or landscape are not affected in the same way by the technical and marketing innovations. The complexity of the subject implies specific works to evaluate the disjointed and joints effects of the policies of innovation, employment and land use.
  - **Research's about the better policies for sustainable development**  
Based on the comparison of the impact of the Eco-brand versus Legal rules
  
  - **A setting flat of the Wine CMO on the sustainable development**  
Important threats appears at the lecture of the recent proposition about the CMO wine reform. A more rigorous evaluation of the impact of the renewal of a pulling up policies based is necessary.

These proposals illustrated starting from the case of the vine growing have a broader interest. The majority of the intensive productions are subjected to the same pressures and are in the search of similar political and strategic solutions than the wine sector. The stakes at issue of the grower's associations and public administrations are majors. An important part of the agricultural amenities in terms of employment, landscape, quality food is now in balance. If the public administration in charge of agriculture, ecology, industry or country management don't ignore these stakes, they have important difficulties to propose integrated politics due to the complexity of the problems when complex consideration such as the safeguarding of the ecological resources or employment interfere with questions of industrial policy. The wine sphere has the chance to posses institutional schedule which permit exchanges of experience between multiple agents. The exercise of tools determination In the next few years still remains highly uncertain and have to engage important investment in governance research to inform decision making by public and private players.

## References

- Aigrain, P. (2006) Réforme de l'OCM vitivinicole et devenir de la spécificité sectorielle. Logrono (Espagne).
- Aubertot, J.-N., et al. "Pesticides, agriculture et environnement - Réduire l'utilisation des pesticides et en limite les impacts environnementaux. Expertise scientifique collective, synthèse du rapport." INRA et Cemagref.
- Conseil-National-de-l'Alimentation. "Avis du Conseil National de l'Alimentation sur les politiques publiques et les démarches collectives en matière d'utilisation des intrants et leur impact sur la sécurité et la qualité des aliments."
- Girardin, P., et al. "IDEICA - Etude prospective sur la caractérisation et le suivi de la durabilité des exploitations agricoles françaises." INRA.
- Godard, O., and B. Hubert. *Le développement durable et la recherche scientifique à l'INRA*. Edited by C. B. e. Perspectives: Editions INRA, Paris, 2002.
- Gonod, P. F. *Matières à (re)penser le développement durable et d'autres développements*. Edited by C. B. e. Perspectives. Paris: Editions INRA, 2003.
- Goulet, E., et al. "Water-stable aggregates and soil organic matter pools in calcareous vineyard soil under four soil-surface management systems." *Soil Use and Management* 20(2004): pp. 318-324.
- Ministère-de-l'Agriculture-et-de-la-Pêche (2003) Liste des produits phytopharmaceutiques retirés en 2003 (application du règlement communautaire n° /2002/CE.
- Montaigne, E., and A. M. Coelho. "The reform of the Common Market Organisation for wine." European Parliament, august 28th 2006.
- Parat, C., et al. "Copper accumulation in vineyard calcareous soils as a result of interactions with organic matter, manganese and iron." *European Journal of Soil Science* 53(2002): pp. 663-669.
- Sébillotte, M., P. Aigrain, and H. Hannin. "Prospective Vignes et vins. Scénarios et défis pour la recherche et les acteurs." coll. Bilan et Perspectives. INRA.

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## **Scenarios for agri-environmental policy design and implementation**

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### **Abstract**

The rapidly changing conditions of agriculture makes scenario thinking a major tool for policy design and implementation.

The objective of this presentation is to discuss how scenario could be applied to agri-environmental policy design, in order to fit with present and future policy issues.

The paper will first review the experience of the author with scenarios through the activities carried out in three EU projects, namely EUROCROP – “Agricultural Research for Improving Arable Crop Competitiveness, ITAES - Integrated tools to design and implement agro environmental schemes” and “WADI - Sustainability of European Irrigated Agriculture under Water Directive and Agenda 2000”.

In the second part, a framework for scenario analysis related to agri-environmental policy will be discussed. The main drivers and stakes connected to agri-environmental policy design will be analysed, considering different levels (regional, EU, world) and the interplay between different parties involved.

The paper concludes with some general discussion and research agenda.

### **1. Objectives**

The objective of the paper is to discuss how scenario could be applied to agri-environmental policy design, in order to fit with present and future policy issues

### **2. Background experience**

The background experience to this paper come from the following EU proejects:

1. TENDER J05/13/2005 - Investment behaviour in conventional and emerging farming systems under different policy scenarios
2. EUROCROP – “Agricultural Research for Improving Arable Crop Competitiveness”, 6fp (CA), 2006-2008
3. ITAES – “Integrated tools to design and implement agro environmental schemes, 6fp (STREP) 2003-2006
4. WADI – “Sustainability of European Irrigated Agriculture under Water Directive and Agenda 2000”, 5fp, 2001-2003

#### Add websites

The project on investment behaviour, Eurocrop and WADI deal directly with scenario applied to agricultural-environmental issues. ITAES concerns agri-environmental schemes design.

### 3. The context

Agriculture is affected by a huge structural change ongoing, including:

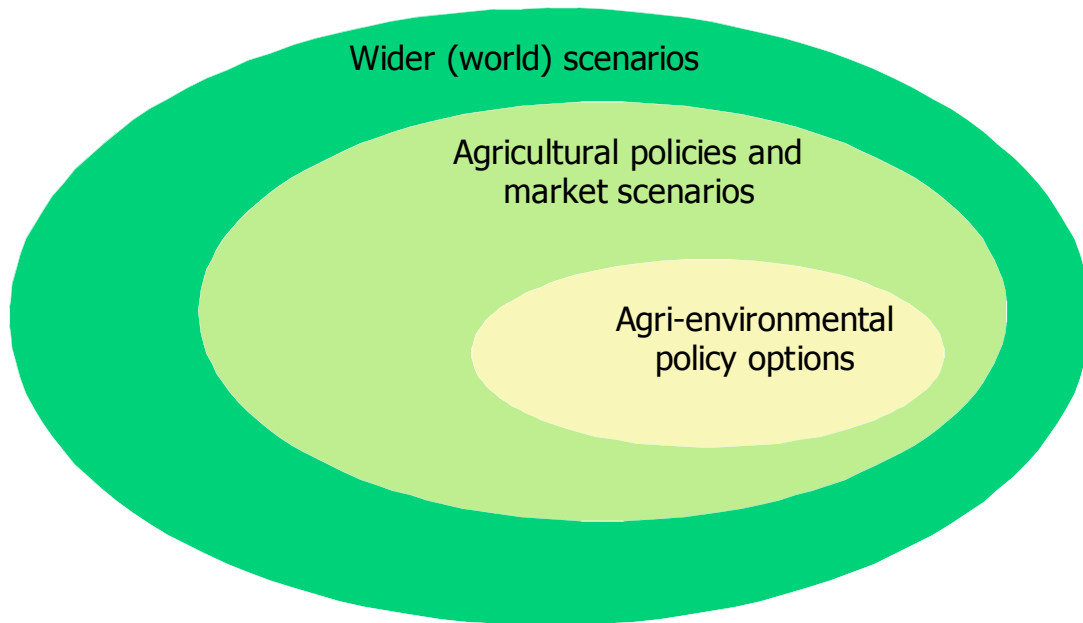
- The shift from household to legal entities
- The interplay between agriculture and the environment
- The state of markets crisis in EU
- The controversial discussion about new technologies
- The 2003 reform and the rural development reform
- Ongoing WTO negotiations

A big emerging issue is what will happen after. There is a diffuse perception of the need of rethinking agriculture and AEPs.

### 4. A reference framework

Figure 1 provides a general framework for the definition of scenarios concerning agri-environmental schemes.

**Figure 1 – A reference framework for the definition of AES scenarios**

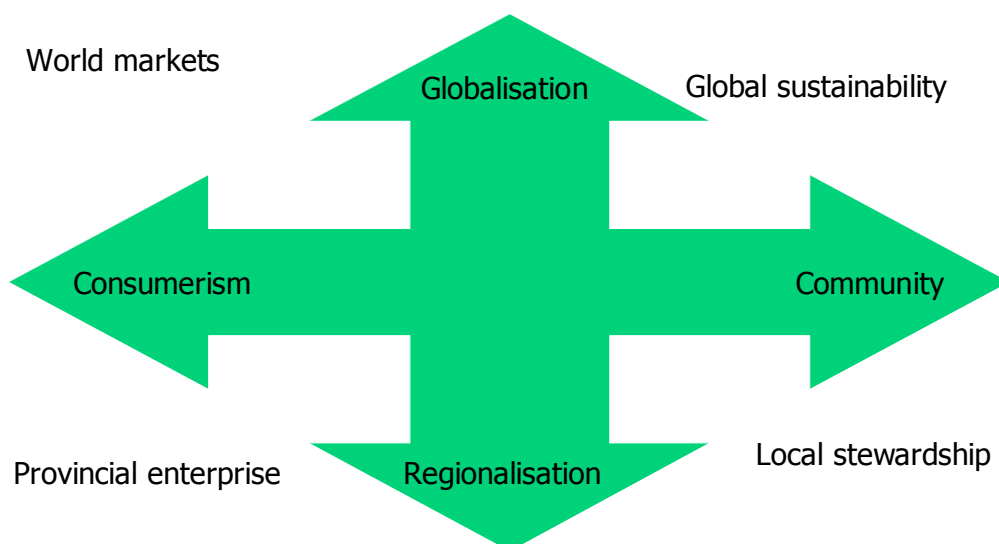


The basic concept is that the outside world, with respect to the agrienviromental system can be divided into several lyers. The main three identified here are AEP options, agricultural markets and policy and the outside world. The following three section are organised around this framework.

## 5. Wider scenarios

A framework for the wider scenario is drawn from the project WADI (Berbel and Gutierrez, 2005) (Figure 2).

**Figure 2 – A framework for the wider scenarios**



## 6. Agricultural policy and market scenarios

Quite a number of variables may define future policy and market scenarios. The most obvious are:

Policy:

- Protection
- Emerging policy priorities

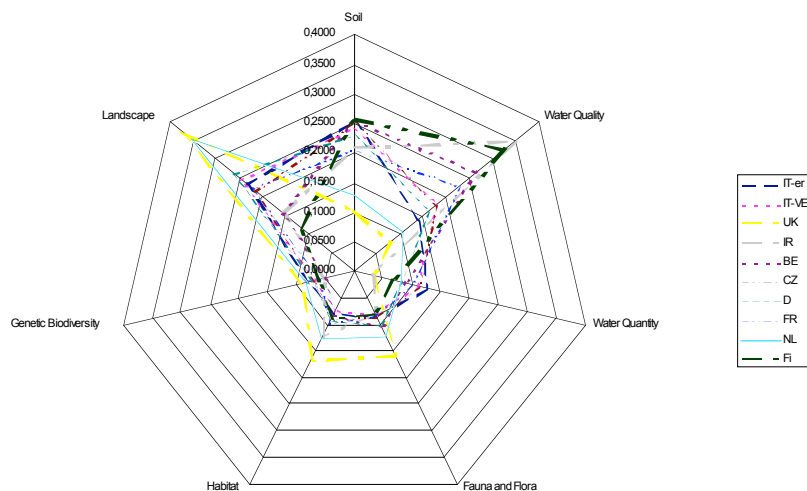
Markets:

- Consumption
- technologies

## 7. Agri-environmental Policy options

Again the variables in policy design may be a number. A major issue will be connected to the trend in AEPs policy objectives. Figure 3 summarizes the outcome of a survey on the relevance of different AEPs objectives.

**Figure 3 – Weight of objectives in a set of regions in the EU**



The figure shows a different profile in different areas. However, the prevalence of measures for soil and water conservation appears rather clear, together with landscape. Less importance attributed to biodiversity in its different forms is also a common feature.

Though experts say that the objectives have not changed since the year 2000, a relevant definition is expected in view of the next rural development programme. Two important distinction in the next generation objectives will be:

- Positive vs. negative externalities
- On-farm vs. off-farm

In order to implement this objectives, the main dimensions of AEP design are (Latacz-Lohman, 2001):

- policy instrument
- target
- addressee
- regulation area
- level of administration
- enforcement strategy

Though AEPs are now perceived as mature policies, a number of options exist. Emerging relevant issues are:

- Connections with other agricultural schemes and policies (RD & leader, cross-compliance, reforms, ...)
- Connections with other policies (urban development and planning, Natura 2000, WFD, ...)
- Local contracts and markets
- Auctions
- Environmental cooperatives
- Environmental agreements
- Role of different institutional levels

## **8. Three questions on sustainability**

### **8.1. How could a desired long-term vision of sustainability for agriculture activity/policy field look like, considering environmental, economic and social elements of sustainable development**

First, let us assume the question concerns the EU. Secondly I would rather say that there may be many sustainability scenarios or many scenarios for sustainability in agriculture.

Here are the storylines of two alternatives:

### **High tech, productive sustainability**

Due to favourable external factors and strong innovation policy, EU agriculture remains to a large competitive on the markets and in labour allocation. Farms will enlarge and become more technologically innovative: precision farming will develop and OGM crops are grown in at least some areas....

### **Low input, extensive sustainability**

Market pressures encourage exit from agriculture and extensification. Local purchase of public goods from agriculture integrate incomes. Quality produces maintain their market using a good degree of technology....

Is this what you ask for???

## **8.2. Which essential elements of sustainability that are integral part of the vision can be defined for the purpose of developing sustainability scenarios**

Scenarios are about alternatives. So the main issue is to identify dimensions that describe the feature of each alternative. Different options may be identified for each alternative and alternatives may be identified by combining the different options for each dimension. The main dimensions may be defined according to the layers of figure 1. In particular:

Layer 1: totally external issues: could include such things as alternative worldwide societal trends (such as those in figure 2, or at least the prevailing values) and climate change. This layer should be defined in as simple as possible way (crossing two main dimensions possibly).

Layer 2: agricultural policy and market scenarios will be the main drivers for agriculture. Any sustainability scenarios will have to deal with this. The three big issues in this layers will be:

- Trends in product market prices: increasing, decreasing;
- Level of support by the EU to agriculture;
- Type of support: e.g. coupled, decoupled, innovation (e.g. investment related);

Layer 3 specific sustainability-related policies. These play an increasing role in CAP (second pillar). The main issues will be:

- Total societal willingness to pay (accept) for agriculture sustainability;
- Distribution: public/private
- Focus on money or on institutions (e.g. governance structure to improve sustainability)

### **8.3. How can current policy objectives of topic complexes be translated to match with the objectives sustainability scenario**

I have difficulties understanding this

## **9. Discussion**

The three levels discussed above are all but disconnected. On the contrary, the connections between scenario levels may play a major role and are a key factor for consistent scenario building.

The definition of scenarios is however accompanied by huge uncertainty, due to the rapidity of change and to the profound revision of the policy approach to agriculture.

An important issue is the growing relevance of non farming factors, though the definition of the economic context and the objectives, aspirations and opportunity costs of farming agents.

In this perspective it should not be forget that scenarios are primarily tool to support affecting the future.

## **10. References**

- Berbel, J. and Gutierrez, C. (eds) (2005): *Sustainability of European Agriculture under Water Framework Directive and Agenda 2000*. European Commission, Bruxelles.
- Latacz-Lohman (2001): *A policy decision-making framework for devising optimal implementation strategies for good agricultural and environmental policy practices*, OECD, COM/AGR/CA/ENV/EPOC(2000)56/FINAL