

# Towards sustainable agriculture and rural areas in Europe

a provisional assessment of four EU regions

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Wettelijke Onderzoekstaken Natuur & Milieu



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**Werkdocument 21**

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# 1 Introduction

## 1.1 Background

Agriculture is an important form of land use in Europe. Approximately 40% of its land surface is used for agriculture. Since the beginning of the European Union (EU) the common policy on agriculture was an important part of EU integration. The current EU agriculture is influenced to a large extent by EU policy. Not only because of the EU Common Agricultural Policy and its accompanied support schemes but also by EU legislation and framework directives on sustainable use of the environment. For instance the Nitrate Directive, the Birds and Habitat Directives, the Water Framework Directive are forms of EU legislation that have effect on the way agriculture and rural areas can develop in future.

The driving forces that influence agriculture and rural areas in Europe are working on a much larger scale than farm level or regional level. The influences of these forces are powerful and seem to increase under the process of globalization. International trade, liberalization of agricultural products, demographical changes and global warming are some of these driving forces that will affect future agriculture in Europe.

The application of EU legislation and the availability of EU funds leave some freedom to EU member states and to its regions. An important question is how different member states use this freedom? What goals do they want to achieve and which focus do they have for their own regions? Next to these institutional adaptation or response to global driving forces there seems to be a bottom up response as well. Farmers and stakeholders in rural areas are looking for new ways to generate extra income. They do this for instance by developing new economic activities or to organize themselves in new cooperatives; not only between farmers but also between farmers and other stakeholders.

The use of EU funds, the translation of EU policies and the rise of new activities and institutions is dependent on the problems and structure of agriculture and rural areas in the regions. The Netherlands is characterized by a high population density, a high percentage of agricultural land use and a very intensive agricultural sector that is dominated by horticulture and livestock production. In Europe there are other regions with more or less the same characteristics. Will these regions develop in the same direction as the Netherlands or in a totally different way in the future?

## 1.2 Objective

The objective of this study is to assess how agriculture and rural areas will develop in a number of EU regions that are 'comparable' to the Netherlands. To achieve this goal the main questions to be answered are:

- Which main forces drive the future of agriculture in these regions?
- How will these regions react on these driving forces?
- Which agricultural transition can be foreseen?

The assessment of these questions will be done for the time frame 2015 to 2040.

### 1.3 Method

The first step is to assess a number of outlooks on agriculture of authoritative organizations. From these outlooks the driving forces and main trends that influence future agriculture and rural areas will be derived. This has been done on a global level and is translated to an European scale. This is described in chapter 2 and in chapter 3. The second step is to look at Europe with a select number of indicators and assess the current state of agriculture in different EU regions. Based on these indicators a choice of four case study regions is made.

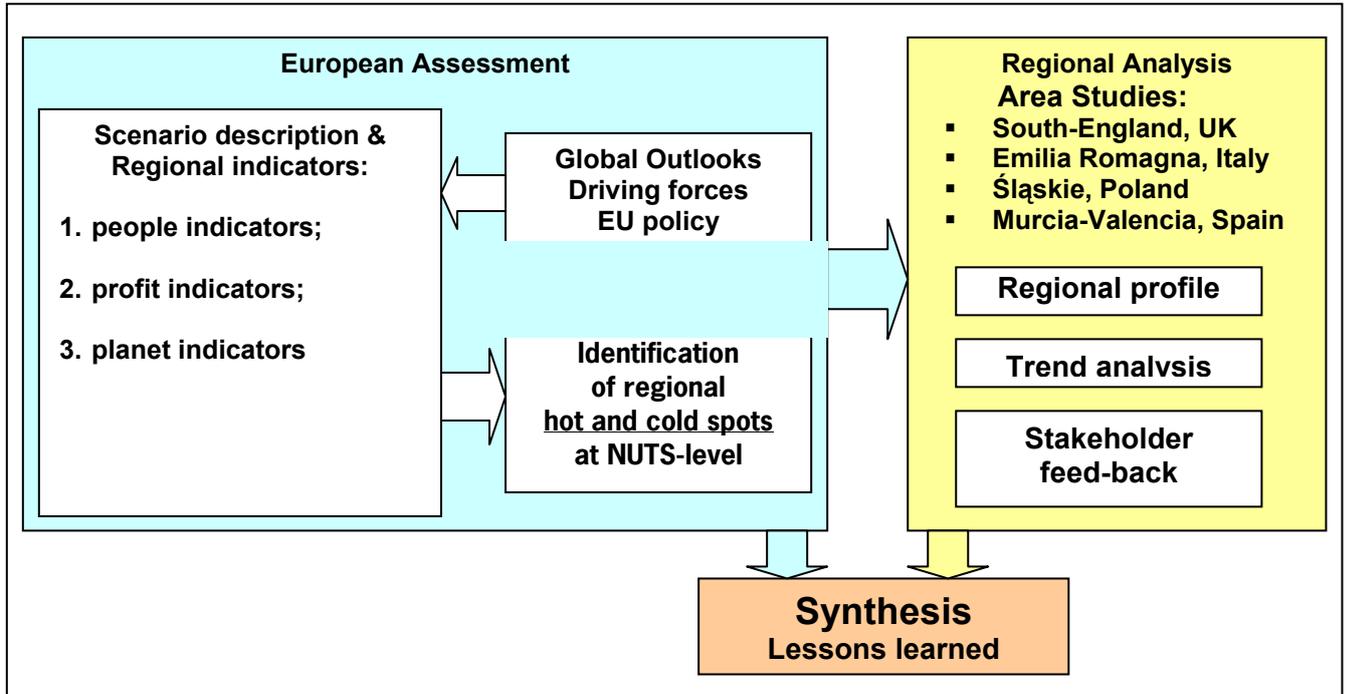


Figure 1: Project scheme

In chapter 4 (step 3) the case study regions are described with available literature, data and documents. For each region an ex ante evaluation of the agricultural transition is made for two future scenarios. In chapter 5 (step 4) a synthesis is made in which the case study areas are compared with each other. Also a translation to the situation in the Netherlands will be made. What can we learn from the policies and approaches in the other regions? Which differences and which similarities are there between the regions and what can we learn from that?

In this study a first provisional assessment has been carried out based on statistics, literature and a qualitative analysis for some scenarios. In a following study the results could be used in discussions with stakeholders for a further regional analysis.

## 2 Global outlooks on agriculture

### 2.1 Introduction

About the future of agriculture and food production a lot has been said and written. In this chapter a number of future outlooks on agriculture and food published by authoritative organizations are summarized. The emphasis is laid on the relation between agriculture and the sustainable use of ecology, economy and social values. Only outlooks on the longer term have been looked at; with longer term the time frame between 2015 and 2040 is meant.

Before stating the different outlooks or visions of diverse institutes and organizations a short anthology is presented of what we can find on the internet on future agriculture. Via 'google' a number of searching terms are assessed. These are 'future farming, farming systems, farming 21st century'. This gives an indication of the direction in which agriculture is heading the next decennia. In the abundance of web pages on this subject, the next topics regularly return:

- gmo free, gmo plus;
- Organic farming;
- New technology;
- Water shortage;
- Renewable energy;
- Climate change in relation to shift in agriculture from south to north;
- Sustainability by new technology versus organic farming;
- Franchise or new organization forms of agricultural holdings;
- Industrial farming; industrial production, feedlots;
- Urban farming.

The themes mentioned above show a large variety. They are correlated to diverse stakeholders with diverse interests but they also originate from scientists and policy makers. Some of the themes are wishes while in other cases they are thoroughly studied and modeled. Anyhow it turns out that the topic of a sustainable future of agriculture and food production engages a lot of people and institutions.

### 2.2 Global outlooks

What do authoritative organizations think about future agriculture? In this section the highlights of a number of recent long-term outlooks of the FAO (World agriculture towards 2015/2030 (FAO, 2005)), the USDA (USDA Agricultural baseline projections to 2014. (USDA, 2005) and the OECD – FAO (Agricultural outlook: 2005- 2014, highlights (OECD - FAO, 2005)) are presented. There are not many outlooks that go as far as 2020 and beyond. Nevertheless we took these outlooks into account to get an indication of main trends.

The reports of these organizations on future agriculture have been scanned on their view on a number of subjects. These subjects are organized in people, profit and planet. Subsequently a subdivision is made in topics. The view or outlook of each organisation on these topics is described.

## 2.2.1 People

### Demography and economic growth

The USDA foresees a slowdown of global population growth to 1.1 percent per year. Population growth rates in developing countries remain above those in the rest of the world. The share of world population in developing countries increases from 80% in 2004 to 82% in 2014. Economic growth will recover and be stable at 3% per year. For the developing countries strong economic growth of more than 5% per year is assumed. Improved global economic performance and growth in population strengthen the demand for food and agricultural products.

FAO - OECD foresees also expansion in the global food consumption. FAO - OECD states this is particularly due to economic performance and population growth (was 1.3% during the last decade, will be just over 1% the next decade) in developing countries. This combined with urbanisation leads to changes in the composition of food consumption, with a fast growing share of animal products. Developing countries are of growing importance to the world's agricultural markets.

FAO foresees a slower growth in food demand because of declining population growth and the already fairly high levels of food consumption in many countries. The world as a whole has the production potential to cope with demand. However developing countries will become more dependent on agricultural imports and food security in many poor areas will not improve.

### Poverty and food security

Consumer food prices are projected to rise less than the general inflation rate. Consumption and imports of food and feed in developing countries are particularly responsive to growth in income. As incomes rise in these countries, consumers generally diversify their diets, moving away from staple foods to include more meat, fruits, vegetables and processed food products (USDA).

FAO – OECD subscribes to this and says trade is affected by changing diets. Dairy and livestock products as well as processed agricultural goods become more important. FAO mentions that except most Sub-Saharan countries developing countries are making progress towards the UN goal of halving the incidence of poverty by 2015. Growth in agriculture and non-farm rural activities as well as improvements in nutrition will be central to continuing success. The decent into poverty of Sub-Saharan Africa is a cause for serious concern. Under nourishment is not merely a symptom of poverty but also one of its causes.

### Employment in agriculture

FAO, USDA and OECD-FAO don't specifically mention employment issues.

## 2.2.2 Profit

### Technology

Yield increases in the US contribute to production gains, limiting price increases and reducing the need for more land to be cropped (USDA).

The FAO - OECD outlook states that farmers will have to make efforts to improve efficiency and productivity being under pressure of lower real prices. Continued productivity gains support higher production in almost all countries, but area expansion is an additional factor in developing countries.

According to the FAO yields have contributed for about 70% of the increase in crop production in the developing countries in the last 4 decades. In the 1990s there was a slowdown in the growth of yields. Wheat yields grew at an average of 3.8% a year in the 1960s, 1970s and 1980s, but only at 2% in the 1990s. For rice the rates went from 2.3 to 1.1 over the same period. Yield growth will continue to be the dominant factor underlying increases in crop production in the future. New technology is needed for areas with shortages of land or water or with particular problems of soil or climate. Agriculture could probably meet the expected demand over the period to 2030 even without major advances in modern biotechnology, according to the FAO. However new techniques could give a welcome boost to productivity particularly in areas with special difficulties.

#### Liberalisation and multinationals

USDA assumes continuation of subsidy schemes towards 2014 but also that agricultural and trade policies continue to evolve along their current path.

FAO - OECD sees a continuing growth in agricultural commodity trade worldwide but it will under perform to non-agricultural trade due to the persistence of large trade barriers. An increasing share of the trade will be south-south trade, with larger exports from new and traditional exporters in the developing world. This will lead to intensification of competition in global commodity markets and a further drop in real prices of agro commodities. The assumption of FAO - OECD is that until 2014 support to agricultural producers by subsidies and border measures that are currently working are continued.

Multinational food companies are the cause and the consequence of the evolving global food system. Reduction in trade and investment barriers, low transport and transaction cost lead to the emergence of multinational corporations. The food industry is no exception to this.

FAO states that trade reform will lower the barriers to trade, will lead to increased global economic integration and will boost incomes. It will continue to do so in future. Most studies according to the FAO show overall welfare gains but not all countries or stakeholders are winners. The benefits would mainly go to consumers and taxpayers in industrial countries, where agriculture is most protected, and to developing country agricultural exporters. Urban and landless rural consumers in developing countries might end up paying higher prices for some foodstuffs (especially milk, cereals, meat and sugar). For most countries, food imports are already an important source of supplies and will continue to contribute to food security.

#### Emerging and mature markets

USDA states that US will remain competitive on most global agricultural markets, although trade competition will remain to be strong. Expanding production in countries like Brazil, Argentina, Canada Ukraine and Kazakhstan provides competition to US exports.

FAO - OECD says that developing countries outpace OECD countries in the rate of expansion of their productivity. The share for most of these OECD countries falls for most products. The food demand is expected to grow only moderately; the role of product and process attributes regarding safety, quality, environment and animal welfare is becoming more important in developed countries.

### **2.2.3 Planet**

FAO states that over the next 30 years, many agriculture-related environmental problems will remain serious. However some problems may deepen more slowly than in the past and some may even be reversed. Important issues of environmental change are the pollution of air and water and the climate change. This is one of the factors that cause a loss of biodiversity. Even

in developed countries with good protection of nature reserves the expansion and intensification of production is a threat to biodiversity. Other environmental problems mentioned are soil erosion and salinization.

FAO-OECD and USDA do not specifically mention 'planet' related issues in their outlooks.

#### Pollution of water and air

Nitrogen fertilizers are according to the FAO a major source of water and air pollution. Although at a slower pace the use of these fertilizers will still grow worldwide. Projections suggest a 60% increase in emissions of ammonia and methane from the livestock sector.

#### Climate change

FAO also states that global warming will not depress food availability at the global level, but the regional and local impacts might be significant. Current projections suggest an increase of crop production in temperate and northerly latitudes, while it decreases in parts of the tropics and subtropics. This might lead to a further dependence of the developing countries on food imports.

### **2.3 Effects of driving forces on the EU25**

The situation of the mature food and agriculture market in EU differs from the picture in large parts of the rest of the world. The demand for agricultural products in the EU is relatively low, because it is already saturated with sufficient food supply. The population will not increase, but remains stable. Moreover, the costs of producing food are in general high due to expensive land and labor. On a global scale the expansion of agriculture will occur outside Europe: in the emerging markets. Nevertheless Europe will remain an important agro producer and consumer in absolute terms, but its share on the global market will decline slowly.

The outlooks described in the previous section give an indication of the worldwide forces that drive agriculture towards the future. Most of the forces have a technological or an institutional nature and seem to be driven mainly by the economy (profit). These forces are of great influence on the change of agriculture and the rural landscape in the EU. The main forces from the outlooks are more or less the same as the forces the European Commission (2004) describes in their report Agribblue:

- Global competition in the production of agricultural commodities; this leads to sustained pressure on agricultural producers;
- Innovation leads to higher productivity per hectare and per farmer;
- Development in information and communication technology;
- Climate change;
- Changes in demography (aging population especially in rural areas);
- Development of low cost transportation and therefore the possibility to import or export commodities over longer distances;
- Reform of the CAP under influence of WTO negotiations and that will lead to lower subsidies;
- Enlargement of the EU with new member states in future (Turkey, former soviet republics, Balkan countries in the further future?).

In many European regions the effects of these large scale forces (global economy and technological progress) are already felt. The outcome for each region differs because of the regional situation in a physical (planet) or a socio-economical (people) sense. This can be seen in changing spatial patterns. In Europe there are three trends in the agricultural structure

noticeable: intensification, extensification and land-abandonment; next to that there are the peri urban regions (European Commission, 2004).

#### Intensification

In well suited regions with good production circumstances, agriculture and related agribusiness are expanding and intensifying. Factors that decide if a region is suited for agriculture are not only soil, water and climate but also a good infrastructure, the current agricultural structure, good environmental conditions, market-access and nearby food and agro industries.

Intensive agriculture often goes side by side with high inputs of nutrients and pesticides per hectare. It also leads to rationalization of the landscape. New technology can contribute to an intensive but environmental friendly way of agriculture. In the last decades industrial ways of farming like intensive livestock farming, greenhouses and horticulture developed especially in areas with suitable circumstances and close to the market or high grade infrastructure.

#### Extensification and land abandonment

Other regions, where the situation is less optimal, cannot stand the competition within the larger Europe. The margins in the bulk agriculture are often very small. Therefore only regions that can produce at very low costs are competitive. In other regions the agricultural economy declines. Farmers go out of business or have to take a job next to being a farmer. This also leads to growing less intensive and less productive crops. In some regions this even leads to abandonment of agricultural area. Because of the continuing improvement of production per hectare in future even less land will be needed to feed the EU population. Land abandonment now occurs in areas that are least suited for agriculture. In these areas the costs of production are higher than the revenues; so these areas can't keep up in the rat race of the international competition on the international food market.

#### Peri urban areas

On the other hand there are regions which are under urban pressure; the so called peri urban areas. These regions are characterized by an expanding urban population and employment. The surrounding rural areas are connected to the urban areas. To many city-people the countryside is an attractive place to recreate or to live. This leads to high prices for housing and land. In these regions agriculture is also feeling the consequences mainly because of higher land prices and sometimes because of stricter environmental and spatial legislations. In these regions there are also new opportunities for employment.

Each of the described processes has its own threats and opportunities. It is not far fetched to draw a parallel between rural areas that are largely dependent on agriculture and regions where in earlier times also one economic sector dominated. Especially when that sector was longtime protected against the free market by the government. One can think of coal production, textile and shipbuilding industry. When the government protection was released rapid developments followed. In most cases this led to the disappearance of that sector (Agriblue, European Commission, 2004).

In the EU agriculture similar rapid changes might occur in the future. These changes will have large effects on the spatial patterns throughout Europe. Even under 40 years of protected agricultural policy the agricultural area in Europe has diminished by 13% since 1960. It is interesting to speculate how land areas would have changed in the absence of these policies (Rounsevell et al., 2004). With the global forces tending towards liberalization and ongoing technical development, it seems somehow certain that in the future this abandoned area will

increase. Next to that the number of farmers and the way of farming might even change more drastic.

## 2.4 Strategic EU policy on rural areas and agriculture

In scheme 1 a subdivision of some EU policy measures is presented. This gives an indication on which fields EU strategically influences rural areas and agriculture. In scheme 1 a distinction is made in people, planet and profit. This is an indicative overview because in practice the boundaries between these P's are not always very sharp and policies seem to have a tendency towards more integration over time. Only a brief description is given of some of these policies.

*Scheme 1 – subdivision of EU policy on rural areas and agriculture*

<b>People</b>	<b>Profit</b>	<b>Planet</b>
<ol style="list-style-type: none"> <li>1. Cohesion and structure policy</li> <li>2. Food safety and animal welfare</li> <li>3. European Directive on Drinking water</li> <li>4. Second pillar of the CAP axis 3 - diversification</li> </ol>	<ol style="list-style-type: none"> <li>1. First Pillar of the Common Agricultural Policy</li> <li>2. Lisbon strategy</li> <li>3. Second pillar of the CAP axis 1 - competitiveness</li> </ol>	<ol style="list-style-type: none"> <li>1. Second pillar of the Common Agricultural Policy financing agro-environmental schemes, nature areas, Less favoured areas (axis 2)</li> <li>2. Water Framework Directive</li> <li>3. Nitrates Directive</li> <li>4. Birds and Habitats Directives; no further biodiversity loss.</li> <li>5. European Wastewater Directive</li> <li>6. Thematic Strategy for Soil Protection</li> <li>7. Kyoto protocol ratification</li> </ol>

### EU Common agricultural Policy

The EU has a long history in policy making in relation to agriculture. The founding of the Common Agricultural Policy (CAP) dates back to the beginning of the EU. Since the 1990s there have been structural reforms (MacSharry in 1992 and CAP Reform in 2003) that resulted in a broader based and more integral CAP with a stronger environmental component. External reasons for this were the negotiations for the WTO agreement, enlargement of the EU and agreements of Agenda 21 for a sustainable development (ECNC, 2005). But there was also domestic pressure towards a more environmental friendly agriculture. Part of the CAP is now the concept of 'good agricultural an environmental practice'.

In the so called second pillar of the CAP the emphasis lies on rural development. Next to subsidies to enhance the agricultural structure, agro environmental schemes and diversification of the rural economy are the priorities.

### Cohesion funds

These funds are focused on enhancing social and economical cohesion of European regions. The funds are mainly allocated to the poorer regions in Eastern and Southern Europe. Investments are mainly for infrastructure and education.

### Food safety

To protect the consumer an extensive legislation is made on the theme food safety. This legislation is applicable to the whole food chain from primary production to food industry and retail.

### Environment, biodiversity and landscape

There are a number of EU directives that make conditions to agriculture in a direct or an indirect way.

The Birds Directive and the Habitats Directive is mentioned to protect either specific species as well as nature reserves. Agriculture in the vicinity of nature reserves and agricultural areas where rare species are found have to apply to the regulations of these Directives.

The protection of water quality and quantity is elaborated in the Nitrates Directive and the Water Framework Directive. These Directives both limit the intensity of agricultural land use. Also the ratification of the Kyoto protocol by the EU is of influence on the rural areas. Resulting from this ratification and from the will to have a secure energy supply EU strives to a use of 5.75% of biofuels in 2010. In the context of sustainable development in Europe and the Green Paper Towards a European strategy for the security of energy supply, the Commission is proposing a genuine action plan aimed at increasing the share of biofuels to more than 20% of European petrol and diesel consumption by 2020 (Directive 2003/30/EC of the European Parliament). The ultimate goal is to reduce dependency on the use of oil-based fuels, which is a significant cause for concern for the European Union (EU) in terms of the environment and security of supply.



### 3 Future scenarios for sustainable agriculture

#### 3.1 Introduction

In section 3.2 four scenarios for future Europe are introduced. These scenarios are no prediction of the future but story lines of different futures that are both plausible and possible. In 3.3 some European maps are presented. Each map indicates the current state of Europe and its regions. The results of each indicator are briefly described in regard to the development of the main driving forces. In 3.4 and 3.5 these maps are elaborated together with the large scale trends for two scenarios. Together the maps and the trends tell the story of the direction in which the EU regions are heading. In 3.6 a synthesis is made and an overview is given of the indicators of the selected case study regions.

#### 3.2 Future scenarios

The long term foresights for worldwide agriculture are dominated by two polarities:

- globalisation versus nationalism or even regionalism
- individual liberty versus national or even global solidarity

These polarities enable market and policy to interact in four basic scenarios (Fig. 2):

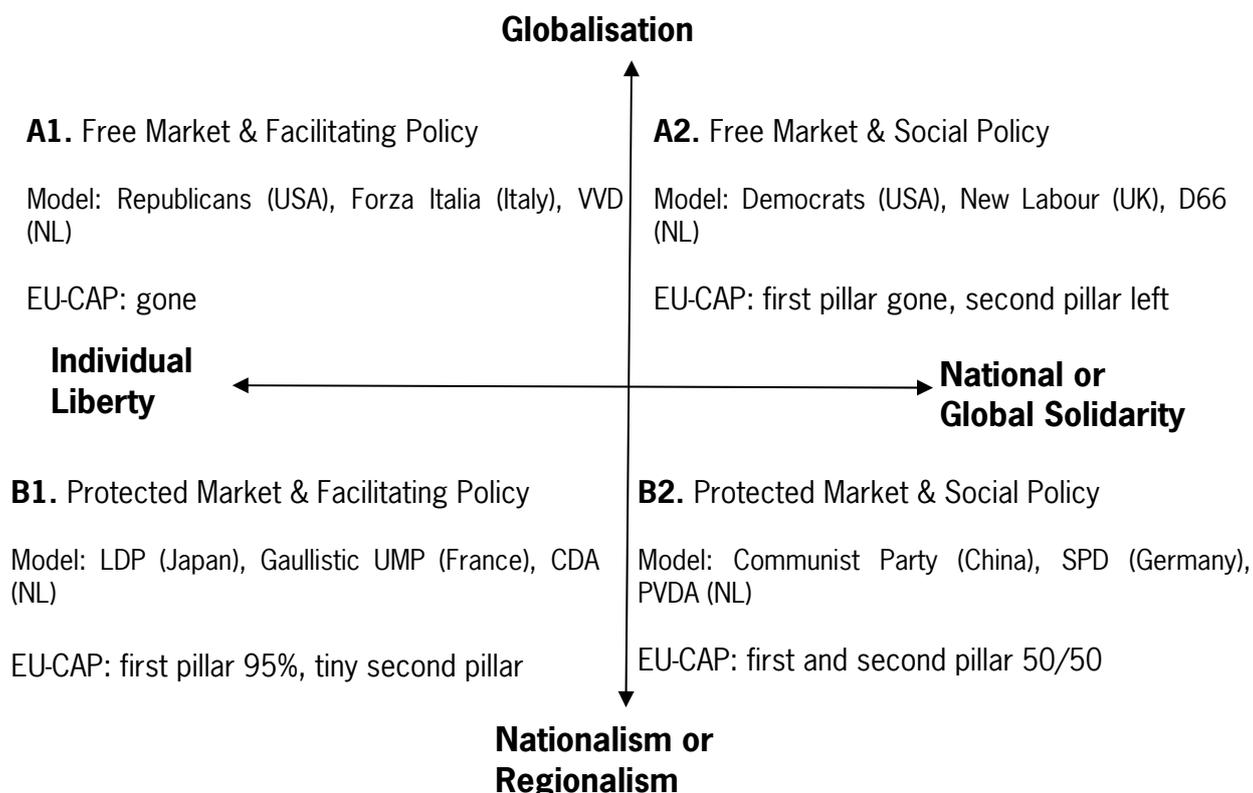


Figure 2 Basic scenarios for Market and Policy of EU in general and CAP in specific.

A1. Free market and facilitating policy is the preference for globalisation and individual liberty. Socio-economically it implies priority of free enterprise and personal responsibility (minimum state, take care of yourself). A typical model for this scenario is offered by the Republicans in the USA (led by Bush), Forza Italia (led by Berlusconi) in the EU and VVD in NL. However, their agricultural policy is still not very consistent. This would be to abolish all subsidies and tariffs. So the EU should dismantle its Common Agricultural Policy (CAP) in this scenario, which makes it quite unlikely for the next 10 years considering the strong support for the CAP. Even thereafter it still seems unlikely, but who knows?

A2. Free market and social policy is the preference for globalisation and national or even global solidarity. Socio-economically it implies priority of free enterprise and social responsibility (strong state, taking care for the weak). A typical model for this scenario is offered by the Democrats in the USA and New Labour (led by Blair) in the EU (D66 in NL). Their agricultural policy is still not very consistent, too though Blair seems willing to change. Ideally, the EU should dismantle the first pillar of its Common Agricultural Policy (CAP) in this scenario, including all support and protection of agri-business. The second pillar, now only 5% of the budget, should be upgraded to support alternative employment in regions where agriculture is outcompeted and conservation of biodiversity and historical landscapes is of EU-importance. Though less radical than scenario A1, A2 still seems unlikely for the next 10 years. Thereafter it would be more likely, certainly if the current scenario B1 would have been replaced by B2.

B1. Protected market and facilitating policy is the preference for nationalism or even regionalism and individual liberty. Socio-economically it implies priority of national and regional holdings and common responsibility of producers and consumers. A typical model for this scenario is offered by the LDP (Liberal Democratic Party, led by Koizumi) of Japan, the Gaullistic UMP (Union pour un Mouvement Populaire, led by Chirac) in France and CDA in the Netherlands. Their agricultural policy is very consistent; both strongly support their agri-business and maintain high trade barriers against competing producers abroad. In spite of growing discontent inside and outside, the EU is still following this scenario with the current CAP covering almost half of total EU-budget and a first pillar spending 95% of the CAP-budget to agri-business. Considering the current tendency of market liberalisation, scenario B1 will likely be left by the EU during the next 10 years.

B2. Protected market and social policy is the preference for nationalism or even regionalism and national or even global solidarity. Socio-economically it implies priority of national and regional holdings and social responsibility. A typical model for this scenario is the Chinese Communist Party, the SPD (Social Demokratische Partei, led by Schröder) in Germany and PVDA in the Netherlands. Their agricultural policy is consistent considering support of national agri-business and trade barriers against foreign producers, as in B1. But their social policy implies more attention to consumer interests and consumer concerns, including sufficient food supply (China), food safety and care of the environment (EU), alternative employment for agriculture (both). From the latest plans of the Commission it seems the EU is going to change from B1 to B2 and reduce the first pillar to boost the second. This change may probably take the next 10 years. The big question is, will the EU maintain B2 thereafter or change to A2?

Figure 2 has been inspired by a similar figure in RIVM (2004). However, "Efficiency" has been replaced by "Liberty" as a more logic opposite of "Solidarity". Besides, the four scenarios resulting from the interaction of the two polarities have been consistently elaborated for Market and Policy, while RIVM named A1: "Global Market", A2: "Global Solidarity", B1: "Safe Region" and B2: "Caring Region", without mentioning concrete policy models of the 4 scenarios and specifying the EU-CAP.

In the next paragraphs A2 and B2 are explored as the most likely scenarios for the EU from 2015 on. We present the foresights of sustainable agriculture from 2015 on at the regional level of the current EU25. These regional foresights are based on a limited set of indicators covering the sustainability concept in all 3 aspects: economically ("profit"), socially ("people") and ecologically ("planet").

### **3.3 Sustainable agriculture in a free market & social policy scenario (A2)**

Under pressure of the EU-partners in the World Trade Organisation, the EU will draw down protection and subsidies (pillar 1 of CAP) in the next 10-20 years. At the same time it will further expand with agrarian states such as Bulgaria, Romania and Turkey. This will intensify internal and external competition for EU agrarian holdings on the world food markets. On the EU home market, competition will be intensified even more since productivity of labour and land will grow faster than the number of consumers (OECD & FAO, 2005). As a result, prices of agrarian products will decrease and unprofitable labour and land will be expelled.

#### **3.3.1 Indicators**

The ever fiercer competition in this A2 scenario will not only be at the level of holdings, but also at the level of EU-regions. Which regions can maintain and which regions will lose agrarian holdings, employment and land? We try to foresee this with some overall indicators for sustainable development of regional agriculture:

##### **1. Profit:**

Mean economical size of regional holdings (ESU/agrarian enterprise/region) indicates competitiveness of regional agriculture and thus its potential to remain profitable and support the viability of the region ("foresight of sustainable agrarian profit").

##### **2. People:**

The combination of 1. and the percentage of agrarian jobs in regional employment indicates the regional potential to maintain agrarian employment and thus the need of alternative employment to support the viability of the region ("foresight of sustainable agrarian employment and need of alternative employment").

##### **3. Planet:**

a. The combination of 1. and population pressure/agrarian ha indicates the regional potential to maintain agrarian land use and thus the need of alternative land use to support the viability of the region ("foresight of sustainable agrarian land use and need of alternative land use").

b. The mean economic yield of agrarian land (ESU/agrarian ha/region) indicates the intensity of agrarian land use and thus its pressure on environment and nature, not only now but also in the future, since high yielding land will remain more competitive and profitable at further intensification than low yielding land ("foresight of extensive and environment safe agrarian land use").

Competitiveness of holdings and regions is prevailing in all 3 indicators of the free market scenario. Regions with the largest holdings will remain most competitive and will lose the least agrarian employment and land use. And regions with the smallest holdings will become

ever less competitive and loose the most agrarian employment and land use. Besides it counts: the higher the agrarian share in total employment or the higher the population pressure on agrarian land, the more agrarian employment or land use will decrease and the more the need of alternatives. So, the combinations of agrarian competitiveness and agrarian employment or population pressure determine sustainability of agrarian employment and land use. **The indicators have been quantified by ranking the regions:**

1. Foresight of sustainable profit: the region with the highest mean size of holdings and thus the largest competitiveness has got ranking value 1 (best foresight).
2. Foresight of sustainable agrarian employment: the region with the lowest mean % of agrarian jobs has got ranking value 1 (the lower this %, the bigger the opportunity to keep it, since it indicates modernity and thus competitiveness of regional agriculture), Subsequently, the region with the lowest sum of ranking values size of holdings and % agrarian jobs has got ranking value 1 (best foresight =combination of the two indicators).
3. a. Foresight of sustainable (remaining) agrarian land use: the region with the lowest mean population pressure has got ranking value 1. Subsequently, the region with the lowest sum of ranking values size of holdings and population pressure has got ranking value 1 (best foresight =combination of the two indicators).  
b. Foresight of extensive (environment safe) agrarian land use: the region with the lowest yielding land has got ranking value 1 (" best foresight").

By quantifying the sustainability indicators by ranking, the regions have got relative foresights. This is suggested to be correct, considering the fact that the future of EU-regions will strongly be related with their relative competitiveness on liberalised world markets including the EU-home market. By relative quantification, we have also avoided the pitfall of the many assumptions needed for absolute quantifications, which make these so little trustworthy for policymaking. The sole assumption in relative quantification is, that the current differences between regions are very robust and indicative for the future. So, the sustainability foresights are based on extrapolation of relative differences.

These 4 generic maps of the future of the EU-25 regions seem a useful basis for further exploration of case-regions including interviews of stakeholders and experts. Can they agree with the position of the region on the generic maps? Or do they see another future of the EU and/or their region?

### 3.3.2 Results

Most recent data were from 2003 (Eurostat, 2005). In every foresight regions have been ranked and subdivided in 5 classes, coloured (deep) green if (most) positive for agriculture and (deep) red if (most) negative. Every class/colour comprises 20% of the EU-25 total of the main indicator of profit, people en planet. In this way the map also shows which regions clustered the highest or lowest concentrations ("heat map").

#### 1. Foresight of sustainable agrarian profit

The best foresight-regions are E-Engeland, NL, NW-France en NE-Germany (Fig. 3). They had 64-225 ESU/holding (European Size Unit, approximately 1200 Euro gross margin steady costs and labour excluded). The worst foresight-regions are the 10 new member states (Czech Republic excluded), Greece, S-Italy, N-Portugal and Galicia. They only had 1-8 ESU/holding. So there is an enormous difference in competitiveness within the EU. But it should be realized that small holdings have more opportunities for side-income, they may even be a hobby. Besides, costs of living are still much lower in new member states (for example

index-values NL and Poland 104 and 60). Therefore, holdings in new member states need much less profit, for the time being. Nevertheless, differences are so big, that a large deal of holdings in worst-foresight regions will have been outcompeted by 2015. Fig. 3 shows that EU-25 agriculture has developed most heat in the western regions: here are the economically largest holdings covering 40% of the EU- agrarian gross margin (deep and normal green).

## 2. Foresight of sustainable agrarian employment

The best foresight-regions are UK, Benelux, NW- and E-France, Germany, Denmark, S-Zweden, Lombardia and Catalunya (Fig. 4). They combine average to largest classes of holdings (Fig. 3) with the 2 lowest classes of agrarian employment (less than 3% and 3-6%). The regions Lissabon en Madrid are exceptions with the smallest class of holdings but one and the lowest employment. The worst foresight-regions are Latvia, Lituania, SE-Poland and Crete. They combine the smallest holdings (Fig. 3) with de highest 2 classes of employment (16-34% and 10-16%). In these worst foresight-regions large numbers of jobs are likely to be lost in their small-scale and labour-intensive agriculture. So in terms of EU-social policy these regions have the largest need of alternative employment ("job creation"). Of course, the existing level of unemployment should also be taken into account if social policy plans are to be made and budgets of the second pillar are to be allocated. Except the remaining regions of Poland, S-Hongaria, also N-Portugal and Greece are in the class of worst foresight but one. All other regions of the new member states have an average or even better foresight.

### 3. a. Foresight of sustainable (remaining) agrarian land use

Best foresight-regions are the western part of France, Denmark, Scotland, S-Ireland, Mecklenburg-Vorpommern, Sachsen-Anhalt en SW-Tsechia (Fig. 5a). They combine average to largest holdings (Fig. 3) with the lowest two classes of population pressure (0.4-2 and 2-3.3 inhabitants/agrarian ha). Worst foresight-regions are Latvia, most of Poland, E-Slovakia, N-Hongaria, Slovenia, Cyprus, most of Italy, N-Portugal and Galicia, Catalunya, Valenciana, Baden-Württemberg, Hessen and N-Sweden. They combine average to smallest holdings (Fig. 3) with average to highest classes of population pressure (10-50 and 5-10 inhabitants/agrarian ha). In these worst foresight-regions, agrarian land use will diminish the most by competition of holdings elsewhere and/or population pressure e.g high land prices. So, here is the biggest need or best opportunity of alternative land use, such as nature, forestry, recreation and water conservation, besides all kinds of red functions (buildings and infrastructure for living, working and enjoying).

### b. Foresight of extensive (environment safe) agrarian land use

The best foresight-regions are the 10 new member states (Cyprus excluded), Central Spain, Alentejo, Sardegna, Corsica, Auvergne, Limousin, Franche-Comté, Wales, North-East, Scotland, northern half of Ireland, Sweden and S-Finland. They only had 0.4 ESU/ha or less, based on extensive farming of beef cattle, pigs, sheep and grains. The worst foresight-regions are Netherlands, Flanders, Nordrhein-Westfalen, Aquitaine, Valenciana, Murcia, N- and S- Italy, Ipeiros and Cyprus (Fig. 5b). They had over 1,3 ESU/ha based on pigs and poultry, intensive dairy farming, intensive cropping of vegetables, sugar beets and potatoes, grapes and other fruits. So there is an enormous difference in intensity of agrarian land use within the EU and so in the environmental burden by erosion and emissions of fertilizers, pesticides and greenhouse gasses. The ranking of the regions seems quite robust for the free market scenario: suitable land for high input demanding high yielding activities will remain intensively used and burdening the environment. On the other hand, less yielding land will remain extensively used or even abandoned for nature development, forestation, water conservation, recreation etc. Only long term climate changes could lead to re-allocation of intensive agrarian activities. And as pointed out with indicator 3a, profitable or affordable non-agrarian activities may expel even high yielding activities from densely populated regions.

#### 4. Overall foresights per region

For a comprehensive evaluation of the foresights of sustainable agriculture of any region, we must consider its position in all EU-25 rankings of profit, people and planet. The overall position is complex. For example, the 4 NL-regions have best foresights of sustainable profit and employment. Though in sustainable (remaining) land use N-NL is in the best class but one, E-NL is in the middle class and W-NL and S-NL even in the worst but one. All 4 regions have even the worst foresights of extensive, environment safe land use. So overall the 3 foresights, N-NL has somewhat better foresights of sustainable agriculture from 2015 on.

### 3.3.3 Discussion

These foresight maps seem quite static and ignoring the dynamics in EU-agriculture. By annual updating the dynamics can be included and underlying assumptions be verified, such as robustness of the ranking of regions with the 4 indicators. If the indicators can prove themselves as robust, policymakers and entrepreneurs will get confidence to use them in long term decision-making.

The foresight maps seem contradictory for single regions. For example, W-NL and S-NL have best foresights for income and employment, though the worst but one for remaining agrarian land use. This contradiction is solved by realizing that the maps reflect different stages of the free market scenario. The stages imply, that liberalisation of global food markets including the EU-domestic market will bring by liberalisation of the regional land markets. For EU-regions no longer need to protect agrarian land use if their population is provided by a global food basket and EU is more than self-sufficient of the limited number of products which can be grown on its own soils and in its own climate zones. So, regional land markets can be liberalised. They should even be liberalised, to come to a EU-wide economically optimum exchange of agrarian and non-agrarian land users within and between regions.

**Stages of the free market scenario** (Vereijken et al., 2005):

a) Competitiveness on the global food markets is prevalent driver.

During this stage (2005-2015?) the *CAP is dismantled to achieve liberalisation of world food markets*, causing an efficiency race, surplus production and ever lower product prices leading to large holdings out-competing small holdings. So the smaller the holdings, the more regions will lose agrarian employment. The 2 foresight maps of sustainable agrarian profit and employment reflect this already ongoing stage, which will largely be passed by 2015.

b) Both competitiveness on global food markets and regional land markets will drive

During this intermediate stage (2015-2025?) *the EU-regional land markets are also liberalised*, causing ever higher agricultural land prices (besides ever lower product prices), leading to holdings with high yielding land and non-agrarian users out-competing holdings with low yields. So the less the yield of the land, the more regions will face take-over and scaling-up of holdings and transition to non-agrarian land use. The foresight map of extensive, environment safe agriculture reflects this stage, in case it is read in reverse: the green most extensive regions (with low yielding land) will face most changes in land use, the red most intensive regions (high yielding land) will face the least changes in land use.

c) Competitiveness on the regional land markets is prevalent driver

During this stage (2025-2035?) *EU-regional land markets are maximally liberalised* for non-agrarian land use. In urban regions non-agrarian sectors may develop much greater economic strength than agriculture. So the more densely populated and prosperous, the more regions

will face inhabitants demand for agrarian land and transition to non-agrarian land use, collective or private. The foresight map of sustainable (remaining) agrarian land use reflects this stage. So, this map contains the farrest foresight.

The foresight maps are dominated by the 2 economically and spatially main sectors by far: grazing husbandry and arable farming. The minor sectors (stable husbandry, horticulture and permanent crops) would be served by specific foresights. With specific foresights of the 5 sectors it could be estimated which is the most probable or least probable to disappear per region (Vereijken et al., 2005).

**EU-CAP in this free market scenario:**

- Building down the first pillar with subsidies and the protection shield against foreign producers to facilitate liberalisation of food and land markets (countries and regions should themselves build down the protection shield against non-agrarian land use)
- Enlarging the second pillar
  - to alleviate the negative effects, notably by supporting regions to create alternative employment in rural areas
  - to grasp opportunities for non-agrarian land use, notably by supporting regions to transform redundant and abandoned land to multifunctional land use including conservation of nature, landscape, water and climate (reforestation) and development of recreation and tourism.

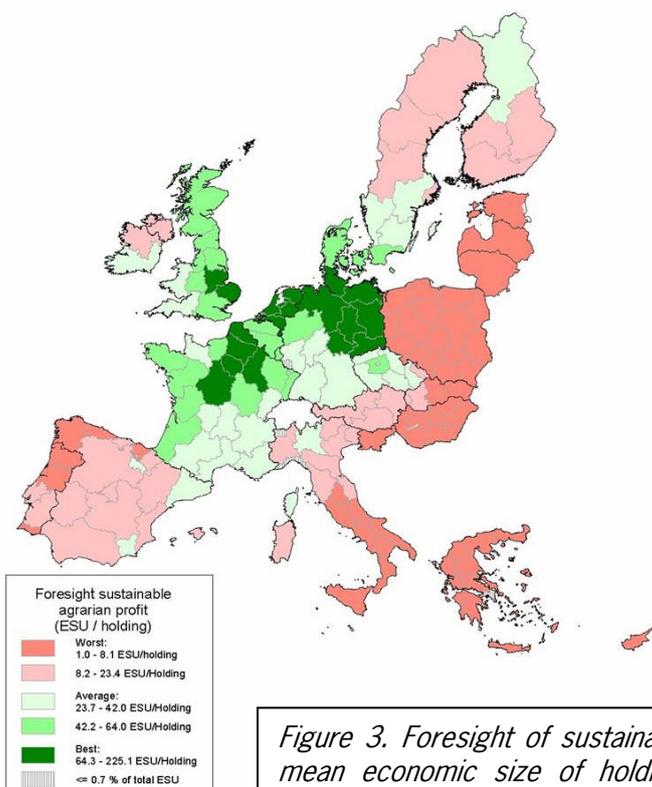


Figure 3. Foresight of sustainable agrarian profit in EU-25 regions, based on mean economic size of holdings (ESU/holding) as sole indicator. (regions ranked by 5 classes, each 20% of EU-total gross margin in ESU)

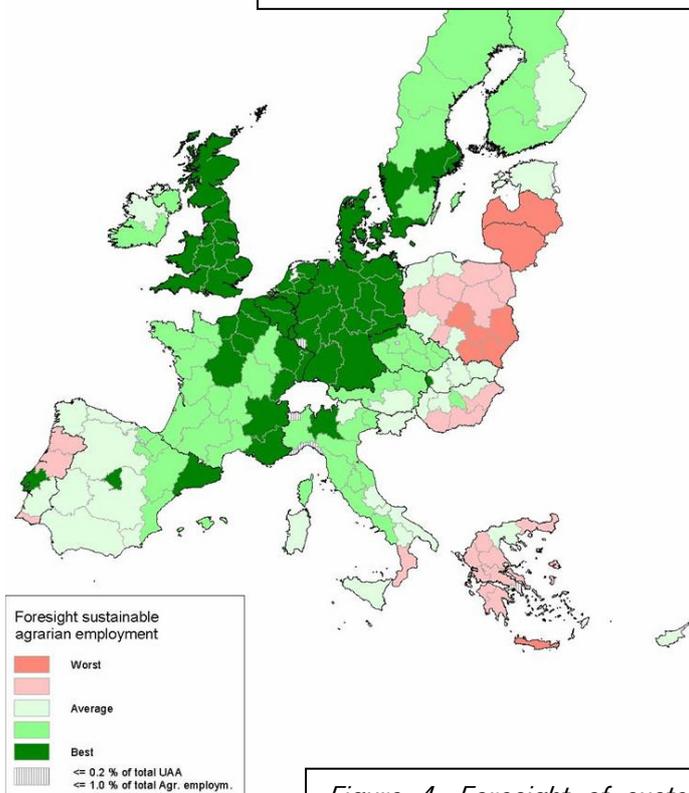


Figure 4. Foresight of sustainable agrarian employment in EU-25 regions, combining mean economic size of holdings and % agrarian employment as equal indicators (regions ranked by 5 classes, each 20% of EU-total agrarian employment)

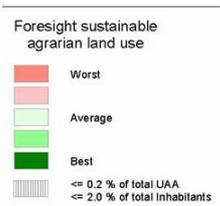
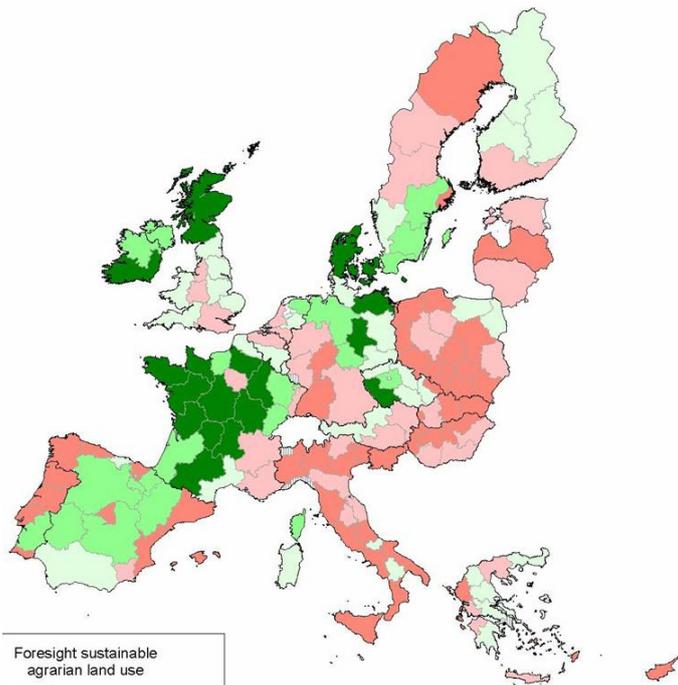


Figure 5a. Foresight of sustainable (remaining) agrarian land use in EU-25 regions, combining mean economic size of holdings and population pressure (inhabitants per agrarian ha) as equal indicators (regions ranked by 5 classes, each 20% of EU- agrarian land use)

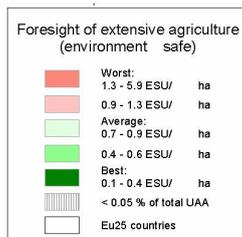
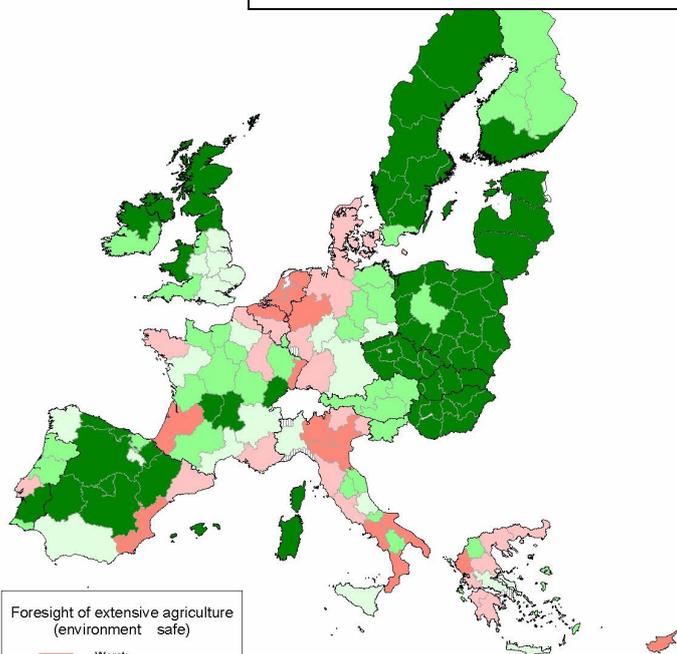


Figure 5b. Foresight of extensive (environment safe) agrarian land use in EU-25 regions, based on mean economic yield/ha (ESU/ha) as sole indicator (regions ranked by 5 classes, each 20% of EU-total gross margin in ESU)

### **3.4 Sustainable agriculture in a protected market & social policy scenario (B2)**

The B2 scenario, often referred to as regional cooperation (RC) or protected market & social policy, is located in the quadrant of solidarity and regionalism. This scenario refers to an image of the future of sustainable development, driven by self reliance of food production, market protection, ecological stewardship and social cohesion (Bont et al, 2005). Within the set of triple Ps, in this scenario Planet and People are more emphasized than Profit.

#### Population and economic development

In the B2 scenario population growth is slow and stabilizes in the long term. This slow population growth implies a tendency of ageing of the population. Economic growth is also rather slow, which means a moderate increase in purchasing power. Income inequalities are small.

#### Consumer preferences

Consumers prefer to consume food produced in their own region. Moreover, there is a tendency towards sustainable, organic and slow food, as a healthy lifestyle is more emphasized. Usually, food consumption follows seasonal production. Although leisure time is rather abundant, the leisure budget tends to be limited. As a consequence, holidays are more often spent in the own country or in Western Europe than in other parts of the world.

#### Agricultural policy

Protection of markets is an important element of the B2 scenario. In order to restrict agricultural production, milk and sugar quota are maintained and set-aside is applied in the cereals sector. Despite the market protection, export subsidies are abolished as a result of trade negotiations. However, since quotation tends to limit agricultural production to self sufficiency levels, this is not experienced as a hampering factor. The European model of agriculture, in which farmers are considered to be both producers of food and landscape, forms an important guideline for the CAP. Within the CAP 'quality production' instead of bulk production is encouraged by using cross compliance in the single farm payments, such as environmental, ecological and animal welfare conditions, but conditions on farm scale as well. Reasonable payments are paid for landscape management by farmers. This enhances the development of multifunctional farms, which are directed at the production of regional, high quality food and land management. Scale enlargement of farms is hampered as these may deteriorate high nature value landscapes. In this scenario the second pillar is extended due to the emphasis on landscape management. However, it is not unlikely that a part of the payments for landscape management are financed by national or regional funds as a result of renationalisation of agricultural policy. Payments to farmers are at such a level that they are sufficient for guaranteeing an economic and sustainable way of living.

#### Land use

Land use planning in order to safeguard the rural landscape is typical for the B2 scenario. Extension of built-up land for residential building and business sites is restricted and due to the tendency to self-sufficiency, trade is limited and additional demand for transport infrastructure low. Areas with cultural heritage or ecological values are protected. Agricultural land tend to be less intensively used and landscape management is applied on quite a large share of agricultural land. The amount of abandoned land is small, as management schemes are applied on these lands. The new managers of these abandoned lands are both farmers and non-farmers. Agricultural land is made accessible by tracks and other services.

### Food processing industry

Food chains are short in the B2 scenario, as production and processing is usually done close to each other. Transport movements are limited. Often, food is directly sold by farmers. Power imbalances between producer and processor hardly exist. Food safety is controlled by policy measures.

### Image of the future of agriculture in the EU regions

Given the emphasis on self reliance of food production, ecological stewardship and social cohesion in the B2 scenario, the continuation of a sustainable agricultural sector in each EU region might be assumed. It is likely that farms tend to be multifunctional, producing both food and landscape. Agricultural production tend to be of high quality, rather extensively or organically produced. Abandonment of marginal agricultural land is successfully prevented by attractive landscape management schemes.

As agriculture in EU regions is in different phases of economic transition, the restructuring of the agricultural sector may be characterized by different dynamics under the B2 scenario. It is likely that in regions with a relatively high share of agriculture in total employment and a high share of small farms, a process of farm enlargement and agricultural labour shed will take place. However, due to land management schemes, land abandonment is not likely to occur in such regions. This restructuring process will result in environmentally friendly farms, due to policy restrictions. In regions with a modern agricultural sector with a limited share in total employment, a small decline of agricultural employment might be expected, slowed down by the more labour intensive way of the high quality production and additional income sources from landscape management.

### Stages of the B2 scenario:

In the long term, two phases could be distinguished in the B2 scenario:

a) phase till 2020: modernization of the agricultural sector in regions with a relatively high share of agriculture in total employment (likely to happen in regions with a share of 10% or more; Fig. 6a) and a tendency to a more extensive agricultural production in regions with a relatively high use of pesticides and fertilizers per ha (likely to happen in regions in the highest categories of economic yields per ha; Fig. 6b).

b) Phase from 2020 onwards: further regionalization of the CAP, with regional quota for agricultural products and regional flat rates. Dilemmas on the size of the regional unit and financing of such a regionalized CAP could result in tensions, especially with regard to the second pillar.

A main part of the budget of the second pillar will be spent on landscape management. Landscape is a so-called public good. Apart from inhabitants from the region, also visitors from other regions may consume this public good. Then the question arises: who has to pay for this landscape management? A possible solution would be to finance landscape management budgets at a national level and to look for a tailor-made implementation of landscape management at regional level.

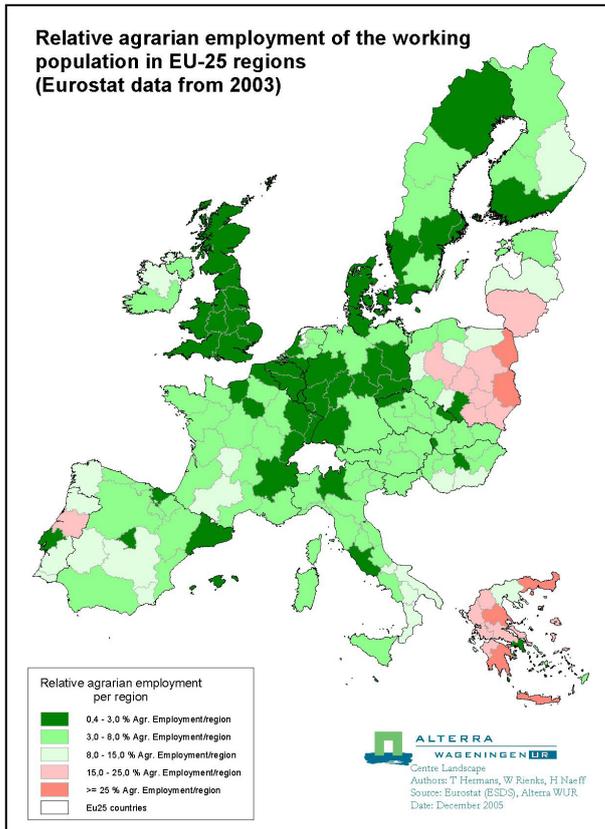


Figure 6a – share of agrarian employment in the working population

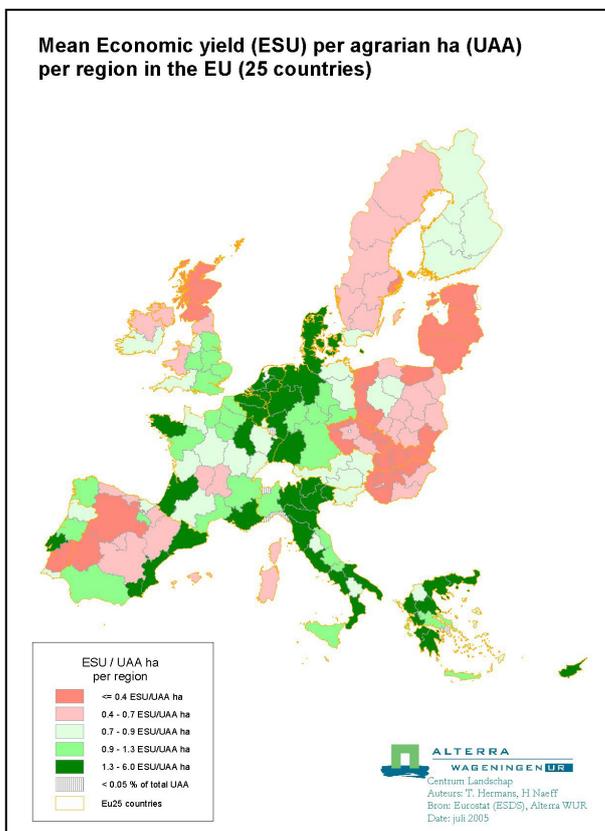


Figure 6b – Extensivity of agrarian land use as indicated by mean economic yield (ESU/ha).

## 4 Foresights of 4 case regions by agrarian sector

### 4.1 Introduction

In the next four sections foresights of sustainable agriculture are presented of four case regions – Emilia Romagna (Italy), Murcia (Spain), Slaskie Voivodship (Poland) and London South East (UK). These regions have been chosen from a preselection of regions (Table 4.1) interesting for the 4 NL-regions:

1. Competitive dairy farming (quite large holdings) facing a moderate population pressure (Emilia Romagna like NL-North).
2. Competitive horticulture and fruit growing facing a moderate population pressure (Murcia like NL-greenports)
3. Little competitive mixed farming, field crops or dairy cows (very small holdings) facing a high population pressure (Slaskie Voivodship like various parts of NL-regions, notably NL-West peat area).
4. Little competitive grazing husbandry (sheep, goats and other grazers) and competitive horticulture, mixed farming, field crops or dairy cows facing a high population pressure (London South East like parts of NL-West, East and South).

*Table 4.1. Selection of EU-25 regions with foresights of sustainable agriculture (ranking profit-employment-landuse) comparable with 4 NL-regions.*

Region	Class foresight profit	Class foresight employ ment	Class foresight		ESU per holding	ESU per ha	Inhabita nts per agr. ha	%% agr. Employ- ment	Reference for:
			remain ing land use	extensive land use					
Thuringen	5	5	4	2	154	0,9	3,0	2,4	NL1 scaling up
<b>Noord-Nederland</b>	<b>5</b>	<b>5</b>	<b>4</b>	<b>1</b>	<b>94</b>	<b>2,4</b>	<b>3,0</b>	<b>3,5</b>	
Niedersachsen	5	5	4	1	69	1,5	3,3	3,3	NL1
Sachsen	5	5	3	2	125	1,1	4,8	2,1	NL2 scaling up
<b>Oost-Nederland</b>	<b>5</b>	<b>5</b>	<b>3</b>	<b>1</b>	<b>73</b>	<b>3,5</b>	<b>6,0</b>	<b>3,1</b>	
Nord - Pas-de-Calais	5	5	3	2	65	1,3	4,8	2,4	NL2
<b>West-Nederland</b>	<b>5</b>	<b>5</b>	<b>2</b>	<b>1</b>	<b>123</b>	<b>5,9</b>	<b>15,7</b>	<b>2,2</b>	
<b>Zuid-Nederland</b>	<b>5</b>	<b>5</b>	<b>2</b>	<b>1</b>	<b>95</b>	<b>5,2</b>	<b>9,3</b>	<b>2,9</b>	
Stredn Cechy	4	4	4	4	47	0,4	2,0	5,2	NL1-4 to Mid-Europe
London-South-East	4	5	2	2	59	1,1	14,5	0,6	NL2-3 population pressure
Murcia	3	3	2	1	24	2,2	3,0	9,3	NL1-4 to Spain
Lombardia	3	5	1	1	37	2,3	9,3	2,0	NL1-4 to Italy
Emilia-Romagna	2	4	2	1	23	1,9	3,8	4,9	preference terluin
Slaskie	1	3	1	4	2	0,5	12,5	2,9	NL1-4 to S-Poland

Each section starts with a profile of the region, derived from the website 'portraits of the regions' of the EU (Eurostat, 2005). Thereafter the foresights of the region at the EU-level (previous chapter) are specified for the main agrarian sectors present, using the most recent data per sector (Eurostat, 2005). Again the foresights are specified for the 2 most likely

scenarios of EU-agriculture between 2020 and 2040, namely A2 (free market-social policy) and B2 (protected market-social policy). These regional foresights per sector are still preliminar. They may be elaborated based on the comments of stakeholders and policymakers in the region in a next phase of the research project. A crucial question for the A2 scenario is how to tune the second pillar of the CAP to the need of support of the case-regions considering innovation of competitive agrarian sectors (or remaining competitive holdings in less competitive sectors), conservation of landscape and nature, and creation of alternative employment.

## 4.2 Emilia Romagna

### 4.2.1 Profile

Emilia Romagna is situated at the south-east of Milan, between the Adriatic Sea and the Apennines. The river Po, originating in the Alps, forms the northern border. Many other rivers originate in the Apennines. Nearly half of the region consists of plains, a quarter is hilly and another quarter is mountainous. A large proportion of the population is concentrated along the old Roman 'Via Emilia', forming a highly urbanised 300 km long line of medium-sized towns, crossing the region from the north west to the south east, and including Piacenza, Parma, Reggio, Modena and the region's capital Bologna (500,000 inhabitants). Industrialization started in the 1950s. A specialization in mechanical engineering, textiles, foodstuffs and ceramics sectors took place, which made the region one of Italy's foremost export areas. Most of the business is small and medium sized enterprises. During the 1990s, non-agrarian employment grew to 0.6% per annum, well above the Italian average of 0.3%. In 1998, GDP/inhabitant was about 60% above the national average. The mountainous areas are outside the radius of influence of the central axis of Via Emilia and have hardly benefited from these economic developments. Hence a gap consists between the plains and the mountainous areas. To date mountainous areas are faced with depopulation and it is only through tourism that the resources of these areas are now being exploited.



*Figure 4.1 Emilia Romagna in Italy*

#### Natural and cultural heritage

There are 3 main ecological areas: the valley of the River Po, the Adriatic coast and the Apennines. In order to preserve nature and its diversity, the regional administration has set up a system of protected areas, consisting of 14 Parks and 12 Nature Reserves. Together, these protected areas cover 7% of the region. Due to its long history, the towns and cities along the Via Emilia offer a wide range of cultural, artistic, musical and culinary heritage.

### Agriculture

Emilia Romagna is the second most important region in Italy as regards to the agri-food sector. Some of its food products are world famous like the Parmigiano Reggiano cheese, the ham of Parma, and wines like Lambrusco, Sangiovese and Colli Bolognese. After the second World War, technological developments resulted in intensive production systems in the lowlands and land abandonment in the hill and mountainous areas. The intensification of crops in the lowland areas have been paralleled by an intensification of livestock production, especially of pig farming in rather big production units. These pigs are partly fed on whey from dairy production. Due to these developments, Emilia Romagna is characterised by three types of agriculture:

1. specialised intensive agriculture in the plain areas, which is very competitive and open to global markets;
2. agriculture focused on quality products;
3. extensive agriculture in the mountainous areas, where it plays an essential part in protecting the land from erosion and maintaining the landscape and integrates with other activities.

In 2001, over 6% of the regional labour force was employed in agriculture.

### Tourism

The Adriatic Riviera is a famous tourist resort. Over 50% of the region's hotels are located here. The Apennines attract many visitors for nature. Numerous spas offer a wide range of health-related facilities. Due to its long history, the towns and cities along the Via Emilia offer a wide range of cultural, artistic, musical and culinary heritage.

### Other economic activities

Alongside the region's traditional products such as foodstuffs, ceramics, clothing, me-chemical engineering, several new areas of production have emerged, such a robotics, biomedicine graphic arts etc.. The regional economy is more export-oriented than in other regions in Italy. Non-agricultural employment increased by 0.6% per annum in the period 1989-1999, which was well above the national average growth rate of 0.3%.

### Environment

A general point of concern refers to the Po basin, which is home to 18 million people, 60% of Italy's industry, about half of its livestock and about 40% of its agricultural output. The bloom of algae is one of the problems with the pollution of the Po water and threatens the tourist industry in the Adriatic Riviera. Together with other Italian regions, Emilia Romagna tries to reduce environmental problems by demanding the use of water treatment installations, constructing modern sewage systems and creating nature reserves in the Po basin. Agriculture produces both positive and negative externalities on the environment. The positives are mainly evident in upland areas, and include landscape variation with vineyards, orchards, citrus groves, pastures, meadows, trees and hedgerows, low intensity pastures and meadows and forests of mixed age. However, due to land abandonment in the hilly and mountainous areas, degradation of rural landscapes emerges with unpredictable environmental outcomes. The negative externalities are mainly evident in the lowlands, where intensification is most acute. These include pollution of groundwater and surface water from nutrients and pesticides, and the disappearance of traditional farming patterns and their replacement with new ones involving loss of landscape variation and negative environmental impacts.

## 4.2.2 Foresights of agriculture by sector

Emilia Romagna has a wide variety of agrarian holdings (total 87,000): mainly in field crops (36,000), mixed cropping (10,000), vineyards (10,000), fruit and citrus (9,000), sheep, goats and other grazers (6,000), permanent crops combined (5000) and dairying (5000) (Table 4.2). Holdings have a quite small economic size (ESU/holding), except for granivores (125), specialists horticulture (98) and specialists dairying (74). In terms of profit, the main sectors (%% = the percentage) of total ESU/region) are field crops (30), dairying (18), mixed cropping (12) and fruits (10). In terms of people, the main sectors (%% of agrarian employment/region) are field crops (28), fruits (15), mixed cropping (14) and dairying (13). In terms of planet the main sectors (%% of utilised agrarian area) are field crops (47), dairying (14) and mixed cropping (12).

Table 4.2. Type and size of sectors and holdings in Emilia Romana (Eurostat, 2003)

	Utilised agrarian area (ha)	La-bour force	No. of holdings	ESU of holdings	ESU per holding	ha per holding	ESU per ha
<i>total</i>	1074550	96980	87510	1993210	23	12	2
13 Specialist cereals, oilseed and protein crops	169380	7790	16130	146990	9	11	1
14 General field cropping	334790	18990	19780	463170	23	17	1
20 Specialist horticulture	8830	1670	830	81270	98	11	9
31 Specialist vineyards	45650	8310	9690	114080	12	5	2
32 Specialist fruit and citrus fruit	69640	14390	9320	203570	22	7	3
33 Specialist olives	390	100	530	630	1	1	2
34 Various permanent crops combined	40230	8870	5180	134550	26	8	3
41 Specialist dairying	150330	12580	4820	358090	74	31	2
42 Specialist cattle-rearing and fattening	16130	890	800	7330	9	20	0
43 Cattle-dairying, rearing and fattening combined	350	50	40	340	9	9	1
44 Sheep, goats and other grazing livestock	34430	2370	6450	12390	2	5	0
50 Specialist granivores	16300	3150	1010	126260	125	16	8
60 Mixed cropping	128600	13480	10150	235100	23	13	2
71 Mixed livestock, mainly grazing livestock	8710	690	320	16600	52	27	2
72 Mixed livestock, mainly granivores	3160	270	60	10850	181	53	3
81 Field crops-grazing livestock combined	31390	1690	1200	54510	45	26	2
82 Various crops and livestock combined	15090	1630	1030	27470	27	15	2

### **Free market scenario (A2)**

Overall sectors, foresights of Emilia Romagna are worst class for extensive agrarian land use, worst but one class for profit and (remaining) agrarian land use and best but one for employment (Table 4.1). However, the foresights per sector are varying depending on the stage of liberalisation.

In the first stage (2005-2015) of liberalisation, sectors of Emilia risk to be gradually out-competed by similar sectors elsewhere, the smaller the mean size of the holdings. Following a rough risk estimation for EU- regional sectors, 67% of agrarian profit, 77% of agrarian employment and 81% of agrarian land run a high to very high risk of being outcompeted (Table 4.3a). A low to very low risk is only run by 11% of agrarian profit, 5% of agrarian employment and 3% of agrarian land. The low-risk sectors are specialists horticulture, granivores and mixed livestock (mainly granivores). They may benefit from the decline of the high-risk sectors by taking over yards and land of outcompeted holdings. Of course, the most competitive holdings within the declining sectors may benefit in the same way and pursue the world-wide price battle and efficiency race.

*Table 4.3a. Risk of agrarian sectors in Emilia Romagna to be out-competed in stage 1 of the free market scenario (liberalisation of food markets is main driver)*

<b>Risk of sectors being outcompeted</b> depending on mean size of holdings/sector	Sectors by code	%% of ESU /region (profit)	%% of agr. employment/ region (people)	%% of agrarian land /region (planet)
<b>very high</b> if <25 ESU/holding	13, 14, 31, 32, 42, 43, 44, 60	55	60	64
<b>high</b> if 25-50 ESU/holding	14, 60, 81, 82	12	17	17
<b>medium</b> if 50-75 ESU/holding	34, 41, 71	22	18	16
<b>low</b> if 75-100 ESU/holding	20	4	2	1
<b>very low</b> if >100 ESU/holding	50, 72	7	3	2

*Table 4.3b. Risk of agrarian sectors in Emilia Romagna to be out-competed in stage 2 of the free market scenario (both liberalisation of food markets and of regional land markets are drivers)*

<b>Risk of sectors being outcompeted</b> depending on mean economic yield /ha/sector	Sectors by code	%% of ESU /region (profit)	%% of agr. employment/ region (people)	%% of agrarian land /region (planet)
<b>very high</b> if 0-1 ESU/ha	13, 14, 42, 43, 44	31	30	51
<b>high</b> if 2 ESU/ha	31, 33, 41, 60, 71, 81, 82	41	41	36
<b>medium</b> if 3 ESU/ha				
<b>low</b> if 4 ESU/ha	32, 34, 72	18	24	10
<b>very low</b> if 5 etc. ESU/ha	20, 50	10	5	3

In the second stage (2015-2025) of liberalisation, sectors risk to be out-competed by similar sectors elsewhere or other sectors in the region (non-agrarian included), the less the mean economic yield per ha. Based on a rough risk estimation for EU- regional sectors, 72% of

agrarian profit, 71% of agrarian employment and 87% of agrarian land runs a high to very high risk of being outcompeted (Table 4.3b). A low to very low risk is only run by 28% of agrarian profit, 29% of agrarian employment and 13% of agrarian land. Compared to the first stage, another two intensive land using sectors run low risk, namely specialists fruits and mixed permanent crops.

In the third stage (2025-2035) of liberalisation, sectors notably risk to be out-competed by non-agrarian sectors in the region, the higher the population pressure and the less the mean economic yield per ha. To specify the risks it is required an analysis at the community level. Overall, Table 4.3b offers an indication of the resistance of sectors to the mean population pressure in Emilia Romagna, which is higher than average compared to other EU-regions (see Table 4.1 and foresight map remaining agrarian land use in EU-25).

### ***Protected market scenario (B2)***

In the B2 scenario, the future of the three distinguished types of agriculture in Emilia Romagna could be imaged as follows. The specialized intensive pig production in the plain areas gradually transforms into organic production, mainly producing for the home market. This implies a drastic decline in the volume of production and also a reduction in employment. There is an increase in the output of quality production and farmers in hill and mountainous areas tend to become landscape managers and tourist entrepreneurs. By doing so, the landscape is conserved and also valorized. In the longer run, compensations for land management are paid by the city dwellers in the region and tourists.

## **4.3 Murcia**

### **4.3.1 Profile**

#### Geography and history

The autonomous community of Murcia is covering 11000 km<sup>2</sup> in the south-east of Spain. Mountains of medium height lead the rainfall into the basin of the largest river in the region, the Segura, the principal source of irrigation for the fertile plains or huertas, which account for 11% of agricultural land. With high temperatures and low rainfall, the regional climate causes serious droughts in not irrigable land, with pastures, grape and cereals. The shortage and poor quality of water affects future prospects for both intensive farming and tourism, since the Tagus-Segura channel at present supplies only a third of the water needs envisaged for irrigation. Also transport and communications infrastructures need strengthening to exploit the enormous tourist potential and to export the products of early crops to Spanish and European markets.



*Figure 4.2 Murcia in Spain*

Economic activity is basically concentrated in four districts situated in the south-east of the region (Huerta de Murcia, Mar Menor and Campo de Cartagena) and in the Vega Media del Segura, where most of the population and its two most important cities are: the capital Murcia (380.000 inhabitants in 2002), and Cartagena (190 000). The inland district of Rio Mula and those in the east and north-east are the most depressed, with low incomes and poor social facilities. During the 1950s the inland rural areas were gradually abandoned by the young seeking the more dynamic districts of the huertas and the coast. With the subsequent emigration of the 1960s, all that was left in the rural areas was an ageing population, living in economically backward districts with population densities not exceeding 40 inhabitants/km<sup>2</sup>. The districts of Huerta de Murcia, Campo de Cartagena, Mar Menor and Vega Media del Segura have the highest population densities in the region, the highest incomes and one of the youngest populations in Spain.

#### Population

There were 1.1 million inhabitants in 2001 in the region. This represents an increase of 9% compared to 1990, largely higher than the national growth over the same period. This increase is due to both an important natural increase and a positive net migration. Murcian population is one of the youngest in the EU, with more than 30% under 25 in 2001. It also has a high share of foreign nationality (6.1% against 3.9% for Spain as a whole). Birth rate exceeded the national average in 2000, making Murcia one of the Spanish regions with the highest population growth during the 1990's.

#### Employment

Of the total population 68 % were of working age in 2000, between 15 and 65 years. In 1999, 28% of the workforce was employed in the industrial sector and 60 % in the service sector both shares being under the national average. The share of the workforce employed in agriculture and forestry was the third highest amongst the Spanish regions with 12 %, just after Galicia and Extremadura. In 2001, women and young people were the most affected among the 54 000 unemployed persons. The unemployment rate was 11%, slightly under the national average. The number of women unemployed was greater than that of men, whilst the youth unemployment rate was double that for the region as a whole. The long-term unemployment rate concerns a relatively small part of the population (20%) compared to the other regions. In agriculture, the unemployment rate is greater than in other sectors. It has increased over the last decade. Services have the least unemployment, approximately half the regional average. In 1999, average wages were 21 % under the national average and were amongst the lowest in the country. Nevertheless the average wages in agriculture were 52 % over the national average, but in industry they were 20 % under the national average and 18 % under the national average in the services sector.

#### Economy

Murcia's economy has grown strongly during the last 1990's, with agricultural and industrial sectors more widely diversified and better integrated than in other similar Spanish regions. In terms of gross value-added per employee, productivity was 17% under the figure for Spain as a whole in 2001. In 2000, the share of gross value added generated by agriculture was 7 %, while the industry generated 28 % of the gross value added of the region and the services sector 65 %. In industry, businesses are generally small or medium-sized and family-owned. Only in the industrial area of Cartagena do the large companies in the metalworking, shipbuilding, oil-refining and chemicals sectors predominate, to which must be added General Electric's plant. In agriculture, the family farm is the norm, with smallholdings being most common. The share in Spanish agricultural production has doubled over the last decade. Peaches, apricots, peppers and tomatoes are main products of the vegetable-canning industry. In the industrial sector, two specialized industrial structures live alongside each

other, the one based on the indigenous potential of the region, the other on large public and private enterprises located in the Campo de Cartagena. The former specializes in the agri-food industry, timber and furniture-making, and leather. The industrial area of Cartagena initially relied on its great naval port and deeply-rooted tradition in mining to embark upon industrial development which concentrated on metalworking and shipbuilding, later diversifying with the setting-up of the chemicals industry and the establishment of the Escombreras oil refinery. The services sector is the most important in the regional economy (more than 65% of value-added in 2000). There are many small businesses in the distribution and lack of tourist facilities.

#### Environment

In general, environmental conditions in Murcia are good in the inland mountains, with nature parks and protected areas such as the Sierra de Espuña and El Valle. Of its still unspoiled coastal beaches, those of Mazarrón are prominent for offering ideal conditions for water sports. Murcia is noted for its large number of monuments, which include the remains of ancient civilizations. There are two localized pollution problems. One of them is to be found in the industrial area of Cartagena, affected by industrial waste and air pollution, and the other is in the coastal area of the Mar Menor, where rapid urbanization is having a harmful effect on the environment.

Nevertheless, the most serious environmental problem is the aridity of the soil and the risk of desertification. Together with the province of Almería, the region is situated in the driest area of Spain. Annual rainfall does not exceed 325 mm, which is scarcely half the national average. Soil erosion is particularly serious, as is the over-exploitation of water resources, which is exhausting the aquifers and increasing soil salinity. Aware of the gravity of this problem, the regional government has a plan for the cleaning-up of the river Segura which is currently being implemented.

#### Education

In 2000 there were 43000 university students of whom 54% women. The university has several faculties - including economics, science and medicine - and university schools.

### **4.3.2 Foresights of agriculture by sector**

Murcia has a wide variety of agrarian holdings (total 38,000): mainly specialists in fruit and citrus (21000), horticulture (4700), vineyards (2100), olives (2000) and various permanent crops (3000) (Table 4.4). Holdings have a quite small economic size (ESU/holding),, except for specialists horticulture (96), diaring (166) and granivores (112). In terms of profit, the main sectors (% of total ESU/region) are horticulture (50), fruit and citrus (19) and granivores (10). In terms of people, the main sectors (% of agrarian employment/region) by far are specialists horticulture (44) and fruits and citrus (29). In terms of planet the main sectors (% of utilized agrarian area/region) are fruit and citrus (30), horticulture (17) and field crops (12).

Table 4.4. Type and size of sectors and holdings in Murcia (Eurostat, 2003)

	Utilised area (ha)	AWU: Labour force	Number of holdings	ESU of holdings	ESU per holding	Ha per holding	LSU per holding
total	410230	42330	37980	913160	24	11	11
13 Specialist cereals, oilseed and protein crops	42200	340	720	7920	11	59	1
14 General field cropping	7370	500	410	8830	22	18	0
20 Specialist horticulture	69610	18660	4750	455420	96	15	2
31 Specialist vineyards	39190	2620	2140	49080	23	18	0
32 Specialist fruit and citrus fruit	122420	12120	21060	176990	8	6	0
33 Specialist olives	8700	500	1950	5710	3	4	0
34 Various permanent crops combined	35240	2000	2970	34890	12	12	0
41 Specialist dairying	120	90	30	4990	166	4	247
42 Specialist cattle- rearing and fattening	1170	190	80	2410	30	15	168
44 Sheep, goats and other grazing livestock	15170	1170	1230	21890	18	12	35
50 Specialist granivores	7560	1690	820	92040	112	9	339
60 Mixed cropping	37520	1480	1110	26640	24	34	3
70 Mixed livestock	3800	170	100	5770	58	38	180
81 Field crops-grazing livestock combined	13300	180	100	4520	45	133	52
82 Various crops and livestock combined	6870	610	450	16060	36	15	51

### **Free market scenario (A2)**

Agriculture of Murcia has average foresights for profit and employment, but its foresight for sustainable (remaining) agrarian land use is of the worst but one class, because of a relatively high population pressure on the average sized holdings. The foresight of extensive agrarian land use (based on ESU/ha) is of the worst class (Table 4.1). However, the foresights per sector are varying depending on the stage of liberalisation.

In the first stage (2005-2015) of liberalisation, sectors risk to be gradually out-competed by similar sectors elsewhere, the smaller the mean size of the holdings. Following a rough risk estimation for EU- regional sectors, 39% of agrarian profit, 52% of agrarian employment and 81% of agrarian land run a high to very high risk of being outcompeted (4.5a). A low to very low risk is run by 51% of agrarian profit, 48% of agrarian employment and 19% of agrarian land. The low to very low-risk sectors are specialists dairying, granivores and horticulture, and mixed livestock (mainly granivores). They may benefit from the decline of the high-risk sectors by taking over yards and land of outcompeted holdings. Of course, the most competitive holdings within the declining sectors may benefit in the same way and pursue the world-wide price battle and efficiency race. A particular issue to be considered is the limited availability of water. On the one hand, competing out of small holdings and weak sectors alleviates the current water problems of sustaining farms. On the other hand, scaling up of sustaining farms remains limited if it requires more water, as in case of horticulture and citrus.

*Table 4.5a. Risk of agrarian sectors in Murcia to be out-competed in stage 1 of the free market scenario (liberalisation of food markets is main driver)*

<b>Risk of sectors being outcompeted</b> depending on mean size of holdings/sector	Sectors by code	% of ESU /region (profit)	% of agr. employment/ region (people)	% of agrarian land /region (planet)
<b>very high</b> if <25 ESU/holding	13, 14, 31, 32, 34, 44, 60	37	51	75
<b>high</b> if 25-50 ESU/holding	42, 71, 81, 82	2	1	6
<b>medium</b> if 50-75 ESU/holding				
<b>low</b> if 75-100 ESU/holding	20, 72	50	44	17
<b>very low</b> if >100 ESU/holding	41, 50	11	4	2

In the second stage (2015-2025) of liberalisation, sectors risk to be out-competed by similar sectors elsewhere or other sectors in the region (non-agrarian included), the less the mean economic yield per ha. Based on a rough risk estimation for EU- regional sectors, 39% of agrarian profit, 52% of agrarian employment and 81% of agrarian land runs a high to very high risk of being outcompeted (Table 4.5b). A low to very low risk is run by 61% of agrarian profit, 48% of agrarian employment and 19% of agrarian land. Compared to the first stage, the same 4 sectors run low risk.

*Table 4.5b. Risk of agrarian sectors in Murcia to be out-competed in stage 2 of the free market scenario (both liberalisation of food markets and of regional land markets are drivers)*

<b>Risk of sectors being outcompeted</b> depending on mean economic yield /ha/sector	Sectors by code	% of ESU /region (profit)	% of agr. employment/ region (people)	% of agrarian land /region (planet)
<b>very high</b> if 0-1 ESU/ha	13, 14, 31, 33, 41, 43, 44, 60, 71, 81	37	51	79
<b>high</b> if 2 ESU/ha	42, 82	2	1	2
<b>medium</b> if 3 ESU/ha				
<b>low</b> if 4 ESU/ha				
<b>very low</b> if 5 etc. ESU/ha	20, 41, 50, 72	61	48	19

In the third stage (2025-2035) of liberalisation, sectors notably risk to be out-competed by non-agrarian sectors in the region, the higher the population pressure and the less the mean economic yield per ha. To specify the risks it is required an analysis at the community level. Overall, Table 4.5b offers an indication of the resistance of sectors to the mean population pressure in Murcia, which is higher than average compared to other EU-regions (Table 4.1).

### ***Protected market scenario (B2)***

Due to severe water shortages, specialist horticulture and specialist citrus fruit and fruit farming types relying on irrigation and producing for export markets tend to decrease rapidly in the B2 scenario. Other farming types using irrigation tend to focus on traditional dry crop production. On the whole, this implies a drastic decline of agricultural production and agricultural employment. Multifunctional farms, based on extensive ways of production and landscape management will be the trend, with emphasis on local quality products, such as olive oil and wines along with organic fruits.

## 4.4 Śląskie Voivodship

### 4.4.1 Profile

Śląskie Voivodship is in the south of Poland at the border with the Czech Republic and Slovakia. It covers 12.3 thousand km<sup>2</sup>, 4% of the national area. In 2001, Śląskie Voivodship had a population of 4.8 million, almost 13% of the national population. The majority (79%) lived in urban areas. The population density of the voivodship is the highest in the country and, at the end of 2001, amounted to 393 persons per km<sup>2</sup>. The region's population is relatively young (half is under the age of 39), in rural areas younger than in urban areas. Nevertheless, the population is slightly declining. In 2001, there were almost 127 thousand fewer people than in 1990. More than 75% of the population lives in the 70 cities of the voivodship. The numerous cities bordering each other in the central portion of the voivodship form the country's largest urban-industrial agglomeration with approximately 2 million residents. Śląskie Voivodship combines substantial industrial potential with agriculture primarily located in the northern and southern portions of the region. Moreover, the area has exceptional scenic, natural and recreational properties favouring the development of tourism. Strong points for the development of the economy and raising the living standards of the population of the region include a substantial production potential and a vast labour market.



Figure 4.3 Śląskie in Poland

#### Agriculture

In 2001, 12.6% of regional employment was in agriculture. Almost 90% of agricultural land was privately owned. The average private farm was 4.5 ha (national average 8.0 ha). Soils in the voivodship are not particularly fertile and primarily used for growing cereals (more than 55% of sown areas) and potatoes (almost 12%). Total cereal yields per ha in 2001 were 5% above the national average. Cattle and pig stocks per 100 ha were below the national averages. A total of 370 million kg of milk was produced (3% of national production), and 105,000 t of animals for slaughter, calculated in meat (3.4% of domestic production). In 2001, Śląskie Voivodship generated 3.6% of domestic gross agricultural output and 3.7% of market agricultural output.

#### Tourism, natural and cultural heritage

Nature makes this region one of the most attractive tourist destinations in the country. The moderate and forested slopes of the mountains in the south offer excellent conditions for mountain tourism including skiing. The upland character of the north with its numerous massive limestone rocks and karstic phenomena offer the right conditions for rock climbers, and the caves for speleologists. In 2001, tourist accommodation comprised 459 collective tourist establishments (6% of the national) with 35,000 beds, of which 7,000 in hotels, motels

and boarding houses. Marked tourist trails, numerous shelters, ski lifts and ski trails encourage tourism in the voivodship.

#### Other economic activities

The region is highly industrialised. Most is traditional heavy industry (with mining as well as hard coal processing and iron and steel milling), which is currently being restructured. Besides there is the manufacture of motor vehicles, machinery and equipment, chemical products, rubber and plastic products, foodstuff industry as well as numerous servicing business, including financials. The basic natural resource of the region is hard coal. The deposits located in the area are among the largest in the world. Also located here are Poland's only exploited deposits of zinc and lead, rock salt and iron ore (currently not exploited), as well as significant deposits of limestone, chalk and dolomite and large resources of underground and mineral waters.

#### Environmental and water concerns

In the 90's strong efforts have been made to improve the natural environment. Despite signs of improvement, violations and threats to the environment remain high compared to other voivodships and national averages. The large concentrations of industry and people render the region the largest producer of industrial and municipal wastewater of Poland. Untreated wastewater discharged per km<sup>2</sup> is more than 4-times higher than the national average (3.5 dam<sup>3</sup> in 2001), and air pollution is more than 5-times particulates per km<sup>2</sup> (2.7 t in 2001) and 7-times more gases (47 t) than the national average.

The threat to the environment by the large quantity of waste (excluding municipal waste) is a particular problem. Almost 4000 tons of waste is generated per km<sup>2</sup> in the voivodship, which is more than 9-times the national average.

### **4.4.2 Foresights of agriculture by sector**

Śląskie has a wide variety of agrarian holdings (total 130,000): mainly in field crops (45,000), crops and livestock combined (22,000), mixed livestock (12,000), cattle including dairying (12,000) fruits (10,000) and granivores (8,000) (Table 4.6). However, holdings have a very small economic size (1-10 ESU/holding). Economically, the biggest sectors (% of total ESU/region) are crops and livestock combined (21%), granivores (15%), mixed livestock (15%), horticulture (13%), cattle including dairying (12%) and field crops (12%). Physically, the biggest sectors (% of total area/region) are field crops (27%), crops and livestock combined (26%), mixed livestock (17%) and cattle including dairying (12%).

Table 4.6. Type and size of sectors and holdings in Śląskie (Eurostat, 2003)

	Utilised agr. area (ha)	Labour force	No. of holdings	ESU of holdings	ESU per holding	Ha per holding	Livestock per holding
total	378910	89830	129920	197510	2	3	3
13 Specialist cereals, oilseed and protein crops	60580	6430	18520	11420	1	3	0
14 General field cropping	41290	10850	26890	12000	0	2	0
20 Specialist horticulture	4130	3790	4050	26040	6	1	0
32 Specialist fruit and citrus fruit	12190	1560	9450	2870	0	1	0
34 Various permanent crops combined	990	470	670	2910	4	1	0
41 Specialist dairying	21840	8980	7550	10140	1	3	3
42 Specialist cattle-rearing and fattening	2080	970	1220	1110	1	2	2
43 Cattle-dairying, rearing and fattening combined	19940	4400	2820	12180	4	7	8
44 Sheep, goats and other grazing livestock	6150	2740	3640	2290	1	2	2
50 Specialist granivores	21270	5280	7800	28860	4	3	20
60 Mixed cropping	22740	6200	9480	9340	1	2	1
71 Mixed livestock, mainly grazing livestock	33430	10160	7390	18450	2	5	5
72 Mixed livestock, mainly granivores	29750	6600	4690	20050	4	6	10
81 Field crops-grazing livestock combined	57070	12410	10380	20780	2	5	3
82 Various crops and livestock combined	42850	8590	11600	19060	2	4	3

### **Free market scenario (A2)**

Agriculture of Śląskie has worst class foresights for profit and (remaining) agrarian land use, average for employment, and best but one class for extensive agrarian land use (Table 4.1). However, the foresights per sector are varying depending on the stage of liberalisation.

In the first stage (2005-2015) of liberalisation, sectors risk to be gradually out-competed by similar sectors elsewhere, the smaller the mean size of the holdings. Following a rough risk estimation for EU- regional sectors, 100% of agrarian profit, employment and land run very high risk of being outcompeted (Table 4.7a). Of course, the most competitive holdings within the declining sectors may benefit by taking over yards and land of outcompeted holdings and pursue the world-wide price battle and efficiency race.

*Table 4.7a. Risk of agrarian sectors in Ślaskie to be out-competed in stage 1 of the free market scenario (liberalisation of food markets is main driver)*

<b>Risk of sectors being outcompeted</b> depending on mean size of holdings/sector	Sectors by code	%% of ESU /region (profit)	%% of agr. employment/ region (people)	%% of agrarian land /region (planet)
<b>very high</b> if <25 ESU/holding	all	100	100	100

In the second stage (2015-2025) of liberalisation, sectors risk to be out-competed by similar sectors elsewhere or other sectors in the region (non-agrarian included), the less the mean economic yield per ha. Based on a rough risk estimation for EU- regional sectors, 86% of agrarian profit, 95% of agrarian employment and 99% of agrarian land run a high to very high risk of being outcompeted (Table 4.7b). A low to very low risk is only run by 13% of agrarian profit, 4% of agrarian employment and 1% of agrarian land. Compared to the first stage, all sectors keep on running high risk, except for various permanent crops and specialist horticulture. The latter may remain strong because of the dense population ensuring a high domestic demand.

*Table 4.7b. Risk of agrarian sectors in Ślaskie to be out-competed in stage 2 of the free market scenario (both liberalisation of food markets and of regional land markets are drivers)*

<b>Risk of sectors being outcompeted</b> depending on mean economic yield /ha/sector	Sectors by code	%% of ESU /region (profit)	%% of agr. employment/ region (people)	%% of agrarian land /region (planet)
<b>very high</b> if 0-1 ESU/ha	All but 20, 34	86	95	99
<b>high</b> if 2 ESU/ha				
<b>medium</b> if 3 ESU/ha	34	1	1	0
<b>low</b> if 4 ESU/ha				
<b>very low</b> if 5 etc. ESU/ha	20	13	4	1

In the third stage (2025-2035) of liberalisation, sectors notably risk to be out-competed by non-agrarian sectors in the region, the higher the population pressure and the less the mean economic yield per ha. To specify the risks it is required an analysis at the community level. Overall, Table 4.7b offers an indication of the resistance of sectors to the mean population pressure in Ślaskie, which is of the highest class amongst EU-regions (Table 4.1).

### ***Protected market scenario (B2)***

In the B2 scenario, a process of farm enlargement will start, accompanied by farm modernization and exodus of farm labour. This labour partly exists of old aged labourers. Young expelled agricultural labourers tend to be employed in the cities nearby. It is likely that the main emphasis will be on arable crop production in the plain areas, if possible, combined with landscape management. On the slopes and in the mountainous parts, the emphasis in agriculture is mainly on landscape management in combination with recreation and tourism, both for people living nearby and for people coming from abroad. In this way, land abandonment is prevented. In the longer run, compensations for land management are paid by the city dwellers in the region and tourists.

## 4.5 London South East

### 4.5.1 Profile

#### Geography and history

The South East region runs in an arc around London; from Kent at the south-eastern extremity, along the coast to Hampshire, Southampton and Portsmouth to the south west, and then to Milton Keynes and Buckinghamshire in the North. In total it encompasses 19 counties and unitary authorities and 55 district authorities. The region is bounded by the sea to the south and east. The region is bisected in the west by the River Thames, whose estuary also provides the region's north-eastern boundary. The region covers 19,000 km<sup>2</sup>, 8% of United Kingdom. It contains four sub-regions: Kent, Hampshire & Isle of Wight, Surrey & East and West Sussex, and Berkshire, Buckinghamshire & Oxfordshire. One third of the region is designated as Area of Outstanding Natural Beauty (AONB). The region also has one of the warmest and driest climates in the UK. Much of the South East of England is characterised by the gently rolling hills of the North and South Downs; the long-distance footpaths of the South Downs Way and the North Downs Way bisect the region. The history of the South East region has been shaped by its proximity to mainland Europe and in particular by migrants from it.

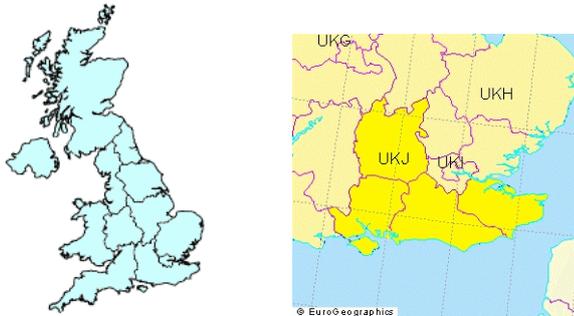


Figure 4.4 *London South-East in UK*

#### Population

There were 8 million inhabitants in 2001, representing 14% of the total population of the UK. In 2002 there was a net inflow of 8,400 people from elsewhere in the UK into the South East. However, while there was a large net inflow from London there was a net outflow to all other English regions. Around 5% of the population are ethnic minorities. Between 1982 and 2002 the population increased by 11%, which corresponds to double the national rate. There are high proportions of older people in East and West Sussex and on the Isle of Wight, whilst in Berkshire, Buckinghamshire and Oxfordshire the proportion of the population over retirement age is low. The birth rate of 11 per 1000 inhabitants in 2001 was just under the UK rate. The death rate was 10 per thousand inhabitants, slightly below national rate.

#### Employment

The region had a workforce of 4.3 million in 2001. The number of persons in employment grew by 8% in the region between 1995 and 2001, which is somewhat higher than the UK average of 7%. In 2002 the region had the highest employment rate of any region of the United Kingdom, with 80%. It is significantly higher for males (85%) compared to females (75%).

The average unemployment rate in the South East has been, for many years, lower than that in any other region. In 2002, this rate had increased and was at 4%, the third lowest of the country.

The South East region has the most highly qualified work-force in the United Kingdom outside London; almost one in five of the population of working age had a university degree or equivalent in 2003. Labour costs in the South-East were the highest of the UK in 2000. Accommodation is relatively expensive; a higher proportion of household income was spent on housing in the South-East than in any other region (1999-2002). Expenditure on travel is relatively high (£77.50 per week compared to the UK average of £64.50 in 1999-2002), where significant numbers of employees work in the capital but live outside it and commute daily to work.

#### Economy

There has been a steady decline in manufacturing in the South East, as in other areas of the UK, whilst the services sector has grown dramatically in the South East. So-called 'sunrise industries' (such as computers and electronics) have however established themselves along the M4 motorway (the 'M4 Corridor') to the west. The region contributed 16% to the Gross Value Added (GVA) of the UK in 1999. The proportions of regional GVA derived from manufacturing and from agriculture are both low relative to the UK average. Nevertheless, because of the size of the region, particularly in terms of population, its contribution to the output of manufacturing and agriculture is relatively high in absolute terms. As the South East is so populous, it inevitably makes a significant contribution to all sectors of the economy. For example, in 2001 around 16% of UK gross GVA and over 11% of UK net capital expenditure in manufacturing were in the South East. In addition to finance and business services, other services including those associated with tourism are important. Tourism plays an important role on the south and east coasts. Some inland areas, such as Canterbury, and other important historic sites also attract tourists to the region.

#### Environment

About 40% of land in the South East is the subject of some form of protective designation; for example, as an Area of Outstanding Natural Beauty, Green Belt, or Site of Special Scientific Interest. In 2001, about 79% of the total municipal solid waste was treated by landfilling, but it has become increasingly difficult to find suitable sites for this. There are almost no 'grossly polluted' stretches of river. Less than 6% of the rivers were reported as chemically "poor" or "bad" in 2000, compared to 15% in 1990.

### **4.5.2 Foresights of agriculture by sector**

London South-East has a wide variety of agrarian holdings (total 19,000): mainly in sheep, goats and other grazers (7,000), field crops (4,000) and cattle rearing and fattening (2,000) (Table 4.8). However, holdings have a quite small economic size (ESU/holding), except for specialists horticulture (306), dairying (122) field crops and grazers (135) and field crops (100). Economically, the biggest sectors (% of total ESU/region) are field crops (38%), horticulture (22%) and field crops and grazers (10%). Physically, the biggest sectors (% of total area/region) are field crops (55%), field crops and grazers (13%) and sheep, goats and other grazers (12%).

Table 4.8. Type and size of sectors and holdings in London South-East (Eurostat, 2000)

	Utilised agr.area (ha)	Labour force	No. of holdings	ESU of holdings	ESU per holding	Ha per holding	Livestoc k per holding
total	106277 0	33800	19120	111856 0	59	56	45
13 Specialist cereals, oilseed and protein crops	525470	5950	3700	361770	98	142	30
14 General field cropping	60310	2520	650	71880	111	93	27
20 Specialist horticulture	4550	4930	810	247560	306	6	3
31 Specialist vineyards	700	80	60	460	8	12	1
32 Specialist fruit and citrus fruit	15190	1880	610	43830	72	25	5
34 Various permanent crops combined	1610	680	150	16780	112	11	1
41 Specialist dairying	69830	1720	770	93740	122	91	155
42 Specialist cattle- rearing and fattening	53580	1870	1710	15230	9	31	47
43 Cattle-dairying, rearing and fattening combined	5280	190	70	4170	60	75	103
44 Sheep, goats and other grazing livestock	126080	6640	7370	32010	4	17	18
50 Specialist granivores	8870	1460	670	45950	69	13	289
60 Mixed cropping	25550	1920	400	42600	107	64	41
71 Mixed livestock, mainly grazing livestock	3900	150	50	4400	88	78	169
72 Mixed livestock, mainly granivores	3780	270	240	4330	18	16	59
81 Field crops-grazing livestock combined	142660	2240	850	114570	135	168	142
82 Various crops and livestock combined	14960	480	190	19280	101	79	218

### **Free market scenario (A2)**

Overall sectors, foresights of London SE are worst class but one for remaining and extensive agrarian land use, best but one class for profit and and best for employment (Table 4.1). However, the foresights per sector are varying depending on the stage of liberalisation.

In the first stage (2005-2015) of liberalisation, sectors of London SE risk to be gradually out-competed by similar sectors elsewhere, the smaller the mean size of the holdings. Following a rough risk estimation for EU- regional sectors, only 6% of agrarian profit, 28% of agrarian employment and 20% of agrarian land run a high to very high risk of being outcompeted (Table 4.9a). A low to very low risk is even run by most sectors, covering 86% of agrarian profit, 61% of agrarian employment and 78% of agrarian land. The main low-risk sectors are specialists horticulture, field cropping and dairying, and mixed cropping and field crops/grazers combined. However, they can hardly benefit from the decline of the high-risk

sectors since demand will exceed the offer of land and yards. For the same reason the most competitive holdings within the declining sectors can hardly benefit by scaling up to pursue the world-wide price battle and efficiency race.

*Table 4.9a. Risk of agrarian sectors in London South East to be out-competed in stage 1 of the free market scenario (liberalisation of food markets is main driver)*

<b>Risk of sectors being outcompeted</b> depending on mean size of holdings/sector	Sectors by code	%% of ESU /region (profit)	%% of agr. employment/region (people)	%% of agrarian land /region (planet)
<b>very high</b> if <25 ESU/holding	31, 42, 44, 72	6	28	20
<b>high</b> if 25-50 ESU/holding				
<b>medium</b> if 50-75 ESU/holding	32, 43, 50	8	11	2
<b>low</b> if 75-100 ESU/holding	13, 71	32	18	49
<b>very low</b> if >100 ESU/holding	14, 20, 34, 41, 60, 81, 82	54	43	29

In the second stage (2015-2025) of liberalisation, sectors risk to be out-competed by similar sectors elsewhere or other sectors in the region (non-agrarian included), the less the mean economic yield per ha. Based on a rough risk estimation for EU-regional sectors, 64% of agrarian profit, 67% of agrarian employment and even 96% of agrarian land runs a high to very high risk of being outcompeted (Table 4.9b). A low to very low risk is only run by 28% of agrarian profit, 21% of agrarian employment and 1% of agrarian land. Compared to the first stage, only three intensive land using sectors keep on running low risk, namely specialists fruits and granivores and various permanent crops combined. With there low economic yield per ha, the remaining sectors are highly vulnerable for non-agrarian sectors such as housing, recreation and services, which can afford much higher land prices.

*Table 4.9b. Risk of agrarian sectors in London South East to be out-competed in stage 2 of the free market scenario (both liberalisation of food markets and of regional land markets are drivers)*

<b>Risk of sectors being outcompeted</b> depending on mean economic yield/ha/sector	Sectors by code	%% of ESU /region (profit)	%% of agr. employment/region (people)	%% of agrarian land /region (planet)
<b>very high</b> if 0-1 ESU/ha	All, but:	64	67	96
<b>high</b> if 2 ESU/ha	60	4	6	2
<b>medium</b> if 3 ESU/ha	32	4	6	1
<b>low</b> if 4 ESU/ha				
<b>very low</b> if 5 etc. ESU/ha	20, 34, 50	28	21	1

In the third stage (2025-2035) of liberalisation, sectors notably risk to be out-competed by non-agrarian sectors in the region, the higher the population pressure and the less the mean economic yield per ha. To specify the risks it is required an analysis at the community level. Overall, Table 4.9b offers an indication of the resistance of sectors to the mean population pressure in London SE, which is of the highest class amongst other EU-regions (see foresight map remaining agrarian land use in EU-25).

### ***Protected market scenario (B2)***

In the B2 scenario, the main function of London South East is to act as a recreation area for city dwellers and as tourist destination. The main role of agriculture is to provide an attractive landscape. Hence, in cereal farming hedgerows and other characteristic landscape elements are maintained or restored. Fruit farmers tend to focus on organic production. The hilly parts are managed by sheep and cattle farmers, who earn their main living from compensations for landscape management, in some cases supplemented by income from tourist activities. Compensations for land management are paid by the region and by tourists.

## **4.6 Conclusions free market scenario**

All case regions have a variation in sectors with striking differences in size of holdings and intensity of land use. This implies striking differences in foresights for sustainability in terms of profit, people and planet (the latter restricted to remaining agrarian land use). In stage 1 of the free market scenario, Emilia, Murcia and notably Slaskie risk to lose high percentages of their agriculture in terms of profit, people and planet. London SE is the exception with more very low risk than very high risk sectors, due to on average large holdings. However, in stage 2 also London SE runs very high risk, due to on average low economic yields per ha. In stage 2 Murcia has more very low than very high risk sectors, due to on average high economic yields per ha. These differences are largely based on the economical and physical shares of intensive and profitable land using sectors as horticulture, permanent crops such as citrus and other fruits, and granivores (pigs, chicken). The higher their share of regional agriculture, the more competitive the region and the lower the risk of being outcompeted, notably in stage 2 by non-agrarian land use. On the other hand, the higher the share of little profitable field crops and grazing husbandry like beef cows and sheep, the less competitive regional agriculture is both in stages 1 and 2.

*Table 4.10. Very high and very low risk for profit, people and planet overall sectors in the four case regions according to the free market scenario*

	Emilia Romagna			Murcia			Slaskie			London SE		
	%	esu	empl land	%	esu	empl land	%	esu	empl land	%	esu	empl land
	profit	people	planet	profit	people	planet	profit	people	planet	profit	people	planet
Stage 1 2005-2015												
Very high risk sectors (25 or less Esu/holding)	55	60	64	37	51	75	100	100	100	6	28	20
Very low risk sectors (100 or more Esu/holding)	7	3	2	11	4	2	0	0	0	54	43	29
Stage 2 2015-2025												
Very high risk sectors (1 or less Esu/ha)	31	30	51	37	51	79	86	95	99	64	67	96
Very low risk sectors (5 or more Esu/ha)	10	5	3	61	48	19	13	4	1	28	21	1
Stage 3 2025-2035												

## **4.7 Conclusions protected market scenario**

In all case study regions intensive agricultural production oriented at export markets tends to disappear, as it does not fit in a society focusing on ecological stewardship and self sufficiency. If possible, these former intensive ways of production are transformed into organic production. In all regions, agricultural employment decreases, but in the long run agriculture still employs a few percents of the regional labour force. Landscape management plays an important role, which not only conserves biodiversity in rural areas but also attracts tourists and day trippers. Compensations for landscape management form a substantial part of agricultural income and are usually paid by taxes, city dwellers in the region and tourists.

## 5 Synthesis and conclusions

The driving forces that change agriculture are operating at a global level. As a consequence of these driving forces, agriculture in Europe is changing. Huge changes already have taken place under quite protected circumstances during the last decades. Towards the future, changes are still on their way. Especially in the new member states, a transition will result in a huge drop of the agrarian employment.

Because of technology improvement and more or less stable food demand on EU scale, there is land to spare on the long term to feed the EU population. What to do with this land? There are several options: leave it for nature, keep the current amount of land but manage it more extensive or even organic, use it for other purposes than food such as for instance energy production (bio-energy) or use it to produce food for the rest of the world (export). Each choice will result in changing rural areas and changing regions.

In this study two scenarios were elaborated to get more grips on what could happen in the future of Europe's rural areas.

### **The global market scenario**

The first scenario elaborated is the A2 scenario – the global market scenario. This leads to a more competitive Europe. The focus lies predominantly on profit issues. Technological development is an important driver. This scenario leads to a Europe with more extremes. There are regions that are intensifying and specializing in a limited number of agricultural sectors and regions with agricultural land abandonment. In this scenario major transitions are foreseen.

In the first stage, it is assumed that due to liberalization of agricultural markets larger and intensive farms will in general out compete small, extensive farms. More specialization takes place in the regions. It is unclear whether small extensive farming sectors fully disappear from the regions or whether hobby farming becomes a new trend, especially in peri-urban areas.

In the second and third stage land markets will gradually liberalize as well. Especially in urban areas and peri urban areas extensive farming can no longer compete for land and cannot scale up. The result is likely that small farms are out competed by farms elsewhere in the world or farms in urban areas being out competed by other forms of land use that are more profitable (housing,).

The resulting agriculture will be characterized by words like 'large scale, specialized, intensive and competitive'. Agriculture only remains strong in well equipped areas. Areas with handicaps (physical conditions, infrastructure, urban pressure) face agricultural land abandonment, and as a consequence land changes to either nature or areas for residential building or recreation. Transitions keep going on over time resulting in a market oriented Europe with most economic/political influence coming from Brussels. In this scenario there will be no or very low subsidies.

### **The protected market scenario**

The second scenario is the B2 – the protected market scenario. This should lead towards equality in Europe. The focus is mainly on people and planet issues. Every EU region intends to maintain agriculture and focuses on sustainable agriculture in relation to landscape, nature

and societal issues. By doing so, the diversity of landscapes and farming in the regions is maintained.

In the first stage of this scenario, current high intensity regions become less intensive. Regions that still have a high share of agrarian employment will in the same time go into transition to lower shares.

After this transition stage more stabile circumstances regarding agriculture and rural areas will appear. Each region will have quota for products. This could result, for instance, in a regional flat rate per hectare agricultural land. This flat rate will differ enormously between the regions as do the prices of agricultural products.

The EU as a whole is self-sufficient for the main agricultural products. A question is whether regional markets cope with these circumstances or that regional authorities have to subsidize the farmers/land managers. Regions will have a lot of autonomy for spending money on sustainable agriculture and linked nature and environment protection.

In both scenarios current agriculture will change in the four studied regions. In the protected market scenario this will lead to a diversified agriculture (many types of farming) in each region over time with much attention for services for the society. In the free market scenario on the other hand, liberalization of agricultural and land markets will result in greater competition. In the studied regions only specialized highly productive and cost efficient holdings are likely to survive the competition for land (with other urban land users) or the competition on the agricultural market (with other farmers elsewhere in the world). In the end this might result in at the one hand highly specialized and competitive farms and on the other hand in areas where agricultural land abandonment takes place. The land will be taken over by city dwellers or hobby farmers.

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