

# The future of rural Europe

An anthology based on the results of the Eururalis 2.0 scenario study



# Colophon

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An anthology based on the results of the Eururalis 2.0 scenario study

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# Abstract

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Eururalis is a scenario study on the future of rural areas in the EU. The time horizon is 2030. It starts from four contrasting world visions and assesses the impact of various drivers such as demography, technology and economic growth. It covers the EU countries in various detail showing impacts for people, planet and profit indicators. These impacts are generated at multiple aggregation levels: from specific regions, to the EU. Eururalis additionally takes into account trends on a global, European and national level. The impact of policy measures on the Common Agricultural Policy and biofuels policy can be assessed within each of the four scenarios. In this book the main conclusions of the study are presented.

## Key words

Rural area, policy, EU, agriculture, Europe, future, scenario, environment, economy, land-use, climate, biofuel, bio-energy, Common Agricultural Policy, CAP, discussion support, model, integrated impact assessment.

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Also look at: [www.eururalis.eu](http://www.eururalis.eu)

# Preface

The countryside plays a vital role in contributing to our quality of life. Which is why it is so important to encourage its robust and diverse development. A living countryside can only be achieved if we take account of the issues confronting our society today. We have to consider future developments and the consequences they may have in other parts of the world. If the balance between People, Planet and Profit is not properly reflected in rural development policy we risk degradation of rural areas.

In the coming years a number of developments in society will be important for rural development policy. These developments are influenced by international actors and issues. They vary from European agricultural policy and regulation on government support to global climate change. Without international cooperation our ability to resolve these problems will be restricted by our national frontiers. Awareness of the supra-national dimension of rural development policy and an open and intensive relationship with our international environment are therefore vital components for achieving a sustainable national and European agenda.

It is not easy to obtain insight into this complex world, especially if we wish to take future developments into account. Eururalis has been used for this purpose and the first version has already given us insight into the important drivers of change for European rural areas. The second version allows us to see the results of policy intervention. For instance, concerning the much debated issue of bio-energy. What are the consequences for food production and how will it affect biodiversity and the landscape? With its clear imaging, Eururalis can provide support for the discussion. Climate, demography and macro-economic developments have serious impact at local and regional level.

The debate has to be conducted over the coming years so that its conclusions can, for instance, be included in the Common Agricultural Policy's Health Check, but also in the discussions on the financial perspectives. It is also important to

look at the implementation of European regulations, such as the Water Framework Directive, regulation on air quality and Natura 2000, not separately, but in relation to each other.

Eururalis can provide an important basis for these discussions. It is unique because it combines useful models with ease of access for the user. It provides information about future developments, and also about the user, who can indicate long-term priorities. This information is a good starting point for developing an agenda with our European colleagues for the future of the European countryside.

*Anita Wouters  
Director-General  
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# The future of rural Europe

**In 2007 the EU celebrated its 50<sup>th</sup> anniversary. This was a good moment for contemplation and putting achieved results in perspective. At the same time it offers the opportunity to look ahead into the future. This is much more difficult than evaluating the past; especially when wishful thinking and realism are intertwined. Moreover, the future is by definition uncertain. Nevertheless, it is important to get hold of what might happen in the future and to find answers to questions such as: What will the EU look like in 25 years? What dilemmas will we face then? How can policy anticipate on current and future challenges?**



In the years to come, Europe's rural areas are likely to be facing major and rapid changes which can significantly affect the sustainability of the EU in terms of Profit, People and Planet (3P). These changes can include intensification of land use in some areas, but depopulation and land abandonment in other areas. The future of European regions depends to a large extent on global driving forces, such as global demography, technological developments, climate change and macro economic growth. Eururalis links these global drivers with the socio-economic, cultural and physical conditions of more than 600 EU regions. The interaction of the global drivers continuously changes the boundary conditions of individual regions. Eururalis can help answer questions such as:

- What are the effects of the accession of the new Member States of the EU on agricultural income, employment or land-use, in both the current and the new Member States?
- How will an ambitious EU policy on biofuels change the landscape?
- What will be the impact of a changing Common Agricultural Policy on European land-use?
- Will rural areas remain viable if agriculture modernizes and people move to cities?
- How will biodiversity be affected by urbanization, changes in land-use or changes in climate?
- Can we secure our own food supply for Europe's population?
- Is a free global market a blessing or a disaster for sustainability in the rural areas?

In interaction with policy makers, scientists have been dealing with these questions within the Eururalis project for the last two years. The focus has been on the rural areas of Europe and with a time horizon at the year 2030. Within the rural areas the main focus has been on developments in agriculture and their impact on socio-economic aspects and the environment. With help of modern



technology the future of rural Europe has been assessed. Four divergent scenarios have been elaborated to express the many uncertainties involved.

During the process numerous amounts of data have been generated, which can be looked at from various angles. The Eururalis tool enables you as the user to choose your own scenario, to look at the results from different viewpoints and to draw your own conclusions.

In this book you will find a number of chapters with the findings and conclusions of the Eururalis project team. Each chapter zooms in on a dilemma that the team filtered out of the results. Some examples of our main findings are listed below to provide an overview of the results.

It is clear that the EU is not an isolated entity in the world. Developments in the rest of the world define to a large extent the future of the rural areas of the EU, e.g. the growth of the global economy and the dependency of the EU on energy sources from abroad. On the other hand, the EU exerts influence on the rest of

the World. A striking example is the EU ambition on bioenergy and the mandatory blending of biofuels. Eururalis results indicate that in order to meet this ambition, the EU will have to rely on substantial biomass imports from elsewhere in the world.

Another finding is that strategic EU policy measures have a major impact on developments in rural areas, although this importance should not be overrated. In many cases policy measures are only one of many factors involved and may only enhance existing trends. Europe will remain a continent with great cultural, socio-economic and physical diversity. The outcome indicates that some regions will thrive whereas other will struggle to maintain the current status quo.

If you would like to know more about the future of Europe or explore the Eururalis results for your member state or region, you have various options. First there is the Eururalis tool which enables you to explore the future and interact with the results by adapting differing policy measures.

In a separate technical document and several scientific papers, it is possible to read more about the data, assumptions and methodologies that have been applied. These documents provide background information on the construction of the Eururalis model framework. Additionally presentations held at scientific and policy conferences as well as issues of the Eururalis newsletter are also available. All this information can be found on the website of Eururalis 2.0, [www.eururalis.eu](http://www.eururalis.eu).

We hope you will enjoy reading this book, and if you are interested, you are welcome to look at our Eururalis data and to draw your own conclusions.

On behalf of the Eururalis project team,

*Willem Rienks*  
*Project leader of the Eururalis 2.0 project*

# What is Eururalis?

**Eururalis is an integrated impact assessment tool which uses four different scenarios for exploring the future developments of the rural areas in Europe within the (dynamic) global context. Results are generated at different aggregation levels, from regions to the whole of Europe and the intermediate aggregation levels. The results facilitate a clear illustration of the trade-offs of policies and world visions as expressed by numerous indicators for European regions and trade-offs over time.**

## Eururalis the framework

Eururalis is based on a conceptual multi-model framework and has a powerful toolbox with data and scientific models to support interactive use. Models incorporated in the framework are: LEITAP (Van Meijl *et al.*, 2006), IMAGE (Eickhout *et al.*, 2006) and CLUE-s (Verbrug *et al.*, 2006). Eururalis is based on four scenarios (for details see next section) which are all based on the same starting point, namely the year 2000. The time frame used in Eururalis simulations ranges from 2000 to 2030. Data used in the model originate from CPB, UN and FAO (see the Eururalis technical document for more information). Results and interpretations are presented in maps, graphs, facts, and figures.

## Eururalis: the scenarios

Because the future has many uncertainties, Eururalis is built upon four scenarios based on four contrasting world visions. This approach of multiple divergent scenarios, distinguishes the Eururalis project from other scenario studies. Most of these studies either use one baseline scenario with some policy variants (e.g. Scenar 2020<sup>1</sup> study), or focus on one dominant event which subsequently changes the world (some scenarios of the Prelude<sup>2</sup> study), or construct a future idealistic world and from there start “backcasting”. In the Eururalis project a different approach was used. In the longer term, the uncertainties of the future can not be explored in one baseline scenario. Therefore, four baseline scenarios

were elaborated in Eururalis. Within each scenario a different, but consistent, evolution towards 2030 was elaborated. It is possible in each scenario to review similar strategic policy variants. The scenarios represent uncertainties as to how the world might develop, i.e. scenarios are used to indicate what *could* happen. Such scenarios help to delineate the margins of the possible and conceivable, and are a means to explore and map uncertainties in the development and the impacts of policy options.

## Scenario concept

The four scenarios of Eururalis follow the concept storylines of the IPCC<sup>3</sup>-storylines which are structured along two axes. In Eururalis, the two axes relate to the two key uncertainties regarding policy approaches to problems and long-term strategies. The vertical axis represents a range from a global approach to a more regional approach, whereas the horizontal axis represents a range from a focus on market-orientation to a high level of governmental intervention to ensure specific economic, social and environmental objectives. This has resulted in a series of four scenarios distinguished by different degrees of global (market) integration and different levels of (policy) regulation (see Figure 1). Additionally, the scenarios were elaborated for land use issues and agricultural policies typical for Europe.

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<sup>1</sup> SCENAR 2020 Scenario study on agriculture and the rural world, European Commission Directorate-General Agriculture and Rural Development. Directorate G. Economic analysis and evaluation. G.4 Evaluation of measures applicable to agriculture; studies. December 2006.

<sup>2</sup> Prelude - <http://scenarios.ew.eea.europa.eu/reports/foI077184>.

<sup>3</sup> IPCC - Intergovernmental Panel on Climate Change. The *IPCC or Intergovernmental Panel on Climate Change* is an organization of the United Nations established in 1988 to assess the risks of climate change.





Figure 1. The four Eururalis scenarios and their main values and steering philosophies.

### A1 Global Economy

The Global Economy scenario depicts a world with *less government intervention and fewer borders* in comparison with today. Trade barriers are removed and there is an open flow of capital, people and goods, leading to rapid economic growth, of which many, but not all, individuals and countries benefit. There is strong technological development. The role of the government is very limited. Nature and environmental problems are not seen as a priority of legislation.

### A2 Continental Markets

The Continental Markets scenario depicts a world of *divided regional blocks*. The EU and NAFTA together form one block. Each block is striving for self sufficiency, in order to be less reliant on other blocks, e.g. Latin America, the former Soviet Union or the Arab world. Agricultural trade barriers and support mechanisms continue to exist. A minimum of government intervention is preferred, resulting in loosely interpreted directives and regulations.

### B1 Global Co-operation

The Global Co-operation scenario depicts a *world of successful international cooperation*, aimed at reducing poverty and reducing environmental problems. Trade barriers will be removed. Many aspects will be regulated by governments, e.g. carbon dioxide emissions, food safety and biodiversity. The maintenance of the cultural and natural heritage is mainly publicly funded.

### B2 Regional Communities

The Regional Communities scenario depicts a *world of regions*. People would have a *strong focus on their local and regional community* and prefer locally produced food. Agricultural policy will be aimed at self sufficiency. Ecological stewardship will be very important. This world will be strongly regulated by government interventions, resulting in restrictive rules in spatial policy and incentives to maintain small scale agriculture. Of the four scenarios, economic growth is the lowest in this scenario.

### Link to 'world visions'

Behind each of the scenarios there are many detailed assumptions. In the end, these assumptions combined with the data of the current situation, are the main drivers for the Eururalis results. The preceding information is somewhat abstract, and to provide the background to the underlying ideas and assumptions, we have linked the scenarios to some well known visions and theories.

The *Global Economy* scenario is linked to the ideas of Francis Fukuyama's 1989 essay, *'The End of History'*. In this document, Fukuyama put forward a controversial hypothesis, namely that the end of the Cold War would signal the end of the progression of human history. He saw the Western liberal democracy as the final form of human government, and the end point of mankind's ideological evolution.

In a reaction to the book, Samuel Huntington formulated a theory in 1993 called *'The Clash of Civilizations?'* He stated that people's cultural and religious identities would be the primary source of conflict in the post-Cold War world. The *Continental Market* scenario has parallels with this theory, where the world is divided in several blocks.

The *Global Cooperation* may be connected to the study *'Our Common Future'*, published by UN World Commission on Environment and Development in 1987. This study is also known as the Brundtland report. Main conclusion was, that the most important global environmental problems are caused by poverty in one part of the world and non-sustainable consumption and production in the other part of the world. The report was the first to ask for a sustainable development path.

The *Regional Communities* scenario may be linked to the ideas of Schumacher who wrote a series of books since 1973 called *'Small is beautiful'*. He concludes that government efforts should be concentrated on reaching sustainable development. Schumacher's philosophy is a philosophy of "enoughness", appreciating both human needs and limitations, and appropriate use of technology. His theory followed from his study of village based economics, which he later termed "Buddhist Economics."

### Policy trade-offs

The Eururalis scenarios are built upon a number of major driving forces, to assess their impact on People, Planet and Profit indicators and on land-use. With the Eururalis tool, trade-offs between indicators, between regions and between continents can be evaluated. A policy measure might have a positive effect on one indicator but it will at the same time influence other indicators; either in a positive or a negative direction. Especially the spider diagrams clearly illustrate, that there are always trade offs between indicators. In Eururalis, policy options can be altered by the user within each of the four scenarios to enable evaluations of future policy measures.

### Aggregation levels of the results

The impact of these scenarios are generated in Eururalis at multiple aggregation levels. Eururalis takes into account the global context, but the results focus on EU27. It is possible to zoom into the generated results at different spatial scales,



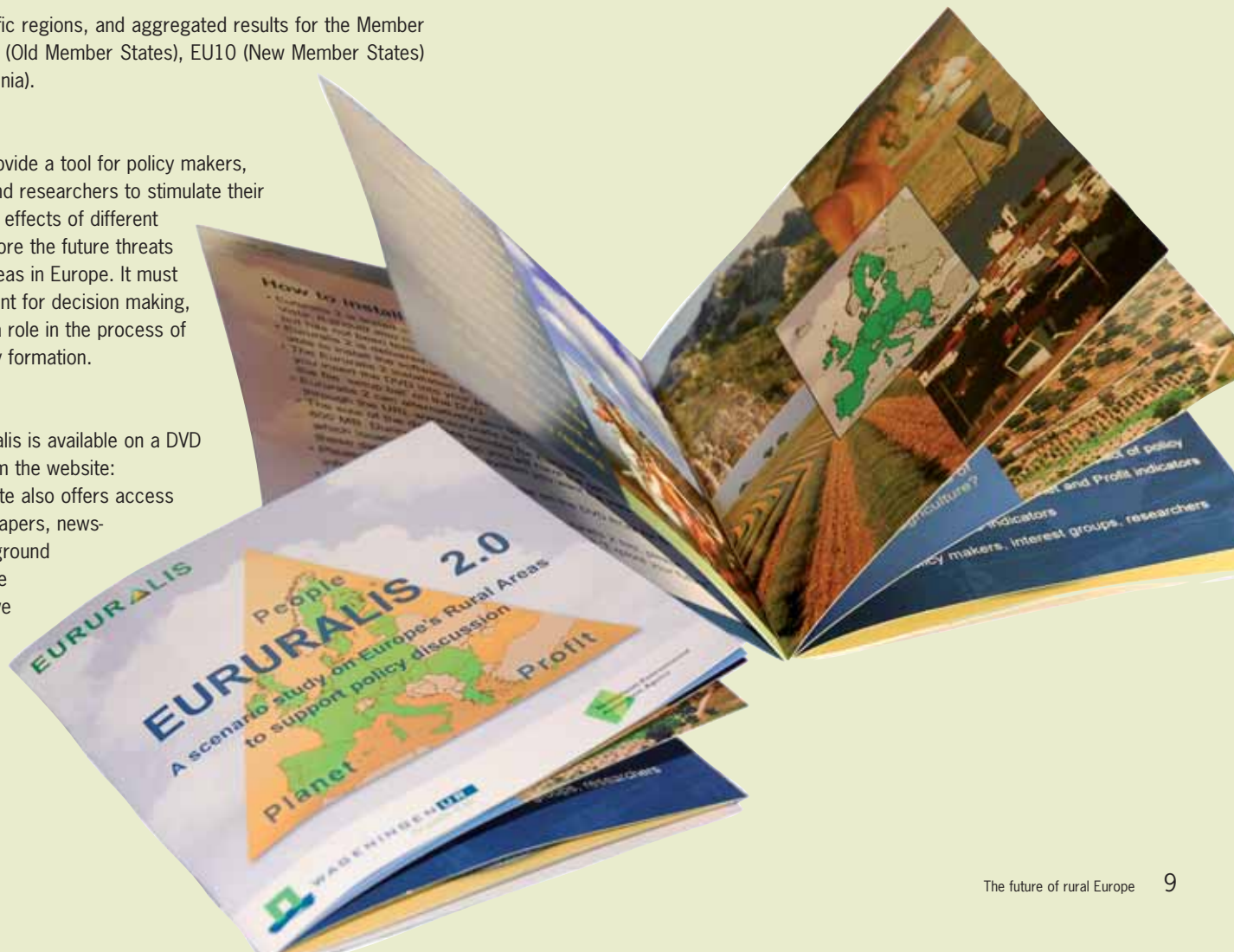
from square km up to specific regions, and aggregated results for the Member States, the EU27, the EU15 (Old Member States), EU10 (New Member States) and EU2 (Bulgaria and Romania).

### For whom is Eururalis?

The aim of Eururalis is to provide a tool for policy makers, students, interest groups, and researchers to stimulate their discussions, to compare the effects of different policy measures and to explore the future threats and opportunities of rural areas in Europe. It must not be regarded as a blueprint for decision making, although Eururalis can play a role in the process of agenda setting and/or policy formation.

### How to obtain Eururalis?

The interactive tool of Eururalis is available on a DVD or it can be downloaded from the website: [www.eururalis.eu](http://www.eururalis.eu). The website also offers access to presentations, scientific papers, newsletters and a scientific background document, explaining in more detail the methodologies have been used and the assumptions that have been made in the project.



# Main conclusions Eururalis 2.0 scenario study towards 2030



## **Future of the EU will be shaped by global forces**

The future of Europe's rural areas will largely be shaped by more or less autonomous global driving forces. Especially the development of (global) demography and macro economic growth outline the trends for rural Europe. These driving forces set the demand for food and fuel and will shape the opportunities and threats in EU regions. EU policies may not completely halt or reverse global trends, but can diminish the negative effects and anticipate future opportunities. Especially for issues such as farm income, farm structure and agricultural abandonment EU policies on CAP and bio-energy make a difference.

## **Changing role of farming**

In all scenarios the agricultural production of Europe will still largely meet the demand of the European population. The importance of farming for the total economy is already small in the EU15 (old Member States). In the EU12 (new Member States) the significance for the economy is likely to decline rapidly over time in all scenarios towards the level of the EU15, leading to a significant decrease in agricultural employment. However, this trend is likely compensated by increased mechanisation, thereby maintaining farming as an important land-use, using nearly 50 percent of the total land surface. Therefore farming will remain to be of great importance for the management of the land and the environment.

## **Agricultural abandonment depends on liberalization and bio-energy**

In all scenarios but the Continental Market scenario the EU27 faces significant land abandonment by agriculture. Especially the liberalization scenarios Global Economy and Global Co-operation show large scale abandonment (10-12% of total agricultural area until 2030). This is a continuation of past trends. Especially the marginal areas in the EU15 are likely to be affected. Although policies will not reverse historic trends, more support of the CAP and stimulation of bio-energy crops will reduce the amount of abandoned land by more than 50%.

### EU12 catches up, but remains behind

Structural changes in the EU12 are larger than in the old Member States. Because of that the EU12 is likely to catch up with the EU15, although it remains behind in farm income and GDP per capita. In this process of change a large amount of agricultural labour will become redundant. The question is whether the rest of the economy in the EU12 can absorb all this surplus labour. When looking at the overall growth of the EU12 economies this will probably not be the case for the majority of regions in the EU12.

### Environmental challenges for future livestock production

In Europe, a number of hotspot regions of livestock production are present. These hotspots are an environmental risk, where strict implementation of environmental policies on water quality is needed to prevent (or stop) pollution of air, soil and water. Concentration of livestock in certain regions can however be logic from an economic point of view, since it facilitates an efficient supply chain. There are also regions with very low livestock rates. In these regions livestock production might enhance agricultural incomes. In regions with a high production of arable crops additional livestock might create opportunities for more efficient nutrient cycling.

### The potentially major impact of bio-energy policy in Europe

The EU-biofuel directive will not be met in any of the four scenarios without additional policies. Substantial subsidies are necessary to reach the 5.75% fuel consumption target in 2010. The impact of such a policy to reach 5.75% will be extensive, affecting many aspects of the rural life. However, the aggregate income from agricultural employment and the contribution of agriculture to GDP will increase only slightly. The most important aspect is the impact on the production of biofuels and land-use. For the EU27 about 4% of total land and about 8% of agricultural land will be used to grow first generation bio-energy crops. Erosion, carbon sequestration and biodiversity will be negatively

influenced by the increased demand for energy crops. The biofuel directive leads to a relatively large production growth in Brazil which induces higher farm incomes, higher land use and related negative implications for biodiversity in Brazil.



### **Changes in CAP imply higher income and less production effects**

The change in the CAP policy from market price support to income support is likely to lead to relatively minor changes in agricultural production, but to more profound changes in agricultural income, land prices and farm structure. Reduction of both income support and market support will cause a decline in agricultural income. The impact of income support on income is most substantial. In contrast to the EU15 the EU12 shows an increase of agricultural income due to production growth and the accession effect until 2010.

### **European policies can impact global targets substantially**

The CAP reform is shifting agricultural production to major food exporting regions such as Brazil because of cost minimization. However, cost minimization of production is not necessarily equal to the lowest environmental pressure on land. In Eururalis it is shown that full trade liberalization leads to a global increase in the area of agricultural land, resulting in biodiversity loss in regions like Latin America. Moreover, the introduction of a Biofuel Directive will have global consequences. In a liberalized world, more than 60% of the biofuels would be imported from outside Europe, of which around 40% will come from Brazil. The resulting land-use impact will lead to further deterioration of global biodiversity, worsening the chances to meet the global biodiversity target. These external impacts of EU policies should be taken into account in future CAP and biofuel discussions.

### **A positive future for EU27 ...**

Farm income and the number of farmers decline, but in general many indicators develop in a positive way for the EU27. Overall GDP increases in all scenarios, agricultural production is maintained although on a smaller area of agricultural land. With additional regulations, the target of replacing 5.75 percent of fossil fuel with bio-energy from crops can be reached, whilst simultaneously soil erosion decreases, biodiversity benefits and carbon sequestration increases.

### **... but regional differences remain large**

Despite these positive overall EU27 developments, many regions will still be facing problems in the future. In general, rural regions in the EU12 will still lag behind in socio-economic aspects, compared to urban areas and the EU15. The structural change of agricultural production will lead to a labour surplus that probably cannot be absorbed by the regions itself. In marginal regions of the EU15 land abandonment may occur on an extensive scale. As a consequence open farmland landscapes will disappear as well as accompanying specific habitats and valued landscapes. Although improvements are observed a large number of regions still lag behind concerning environmental issues such as erosion, biodiversity loss and large nutrients surpluses.

### **Need for policy coherence on different scales**

On at least three scale levels there is an important role for policy to enhance sustainable development in rural Europe. On the global level, climate change and trade liberalization require attention. On the EU27 and the national level, the future of sustainable agriculture in relations to land management and socio-economic aspects should be discussed in relation to the CAP and other EU policies such as the structural funds. On the regional level the opportunities and threats coming from the higher scales should be addressed with an appropriate fit rural development strategy. A specific rural development strategy per region is needed to take into account the major differences between regions. Understanding the interactions and trade offs of policy on different temporal and spatial scales is essential for good governance.



# Future shaped by global forces

To an important extent, the future of Europe's rural areas will largely be shaped by more or less autonomous global driving forces. Especially the developments of global demography and macro economic growth will define the future trends for rural Europe. These driving forces will set the demand for food and fuel and will shape the opportunities and threats in each region of the EU. Simulations of Eururalis indicate, that although EU policies may not completely halt or reverse the global trends, they can facilitate these trends and anticipate the future opportunities. Especially issues such as farm income, farm size and agricultural abandonment, will be affected by EU policies on CAP and bio-energy.

## Population growth

Worldwide, growth of population is an important driver for global demand for food, affecting agricultural production and international trade. The global population is expected to increase from approximately six billion people in the year 2000 to around eight billion in 2030. An additional two billion people will need food, housing and energy!

The European population does not show such a spectacular expansion. The EU currently has 480 million inhabitants. In 2030 the current 27 members are likely to have a population between 450 and 500 million people depending on the scenario. In all scenarios the "grey pressure" (ratio of number of people older than 65 years and population between 15-64 years) sharply increases. The greying will probably affect the rural areas more than the urban areas.

## GDP growth

Macro economic growth, expressed as Gross Domestic Production (GDP), is another important driving force. Growth of GDP affects rural areas in a variety of ways. Especially in poorer countries, an increase in the GDP will lead to changes in the demand for food, the desired food quality and the food type. Generally, a

shift towards more expensive products such as fruit and livestock products can be expected. This affects the regional agricultural production, as well as the import of products and commodities from abroad. When GDP is higher, the rate of technological development is expected to increase, in addition to increased demand for space for housing (urbanization), infrastructure and recreation. GDP increases in all Eururalis' scenarios, but at different rates (see Figure 1). Growth rates are the highest in the liberalized scenarios, i.e. Global Economy and Global Cooperation.

## Technology

In modern society, technology is an important driver for economic development. In rural areas specifically, the technological progress in agriculture is of major importance. During the last century, parallel with major changes in technology,

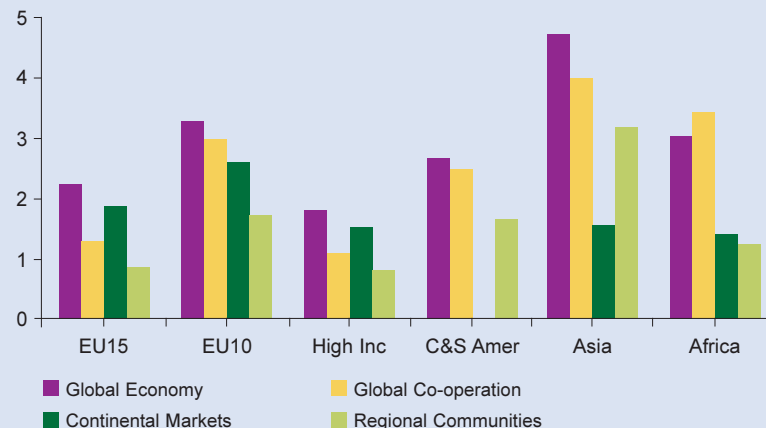


Figure 1. Change in GDP per capita, yearly growth rates in different regions of the world in the four scenarios.



the output and productivity of agriculture have shown a large increase. For example, wheat yields grew at an average of 3.8% a year in the 1960s, 1970s and 1980s, slowing down to 2% in the 1990s. For rice, these rates went from 2.3% to 1.1% over the same period.

Yield growth is expected to continue in future. New technologies such as genetic modification, GPS, robots and information systems together with better management and education of farmers will help to maintain this trend. Raising the productivity in agriculture, however, has two pitfalls. It usually leads to a reduction of the number of people working in agriculture. Secondly, it can lead to land abandonment in certain regions, since not all land is suitable for mechanized farming, and for a more efficient agriculture less land is needed to achieve the same production.

### Impact of global forces

Each of the four Eururalis scenarios is based on a specific set of assumptions for each of the driving forces. The unique set of combination of assumptions are all plausible within the next 30 years. Results are illustrated with spider diagrams such as Figure 2. Figure 2 shows the results for five important indicators for the year 2030. Agricultural employment is one of the impact indicators. It is presented as an index where the year 2000 equals 100. The figures attached to each indicator in the diagram give an indication of the band width between the different scenarios. The agricultural employment indicator varies between 75 in the Global Economy scenario and 85 in the Regional Communities scenario. In the future each of the indicators is most likely to attain values within this range. Thus in all scenarios in Figure 2, agricultural employment will decline in comparison to the year 2000. Underlying driving factors are a higher labour productivity in the agricultural sector and in some scenarios increased imports from abroad.

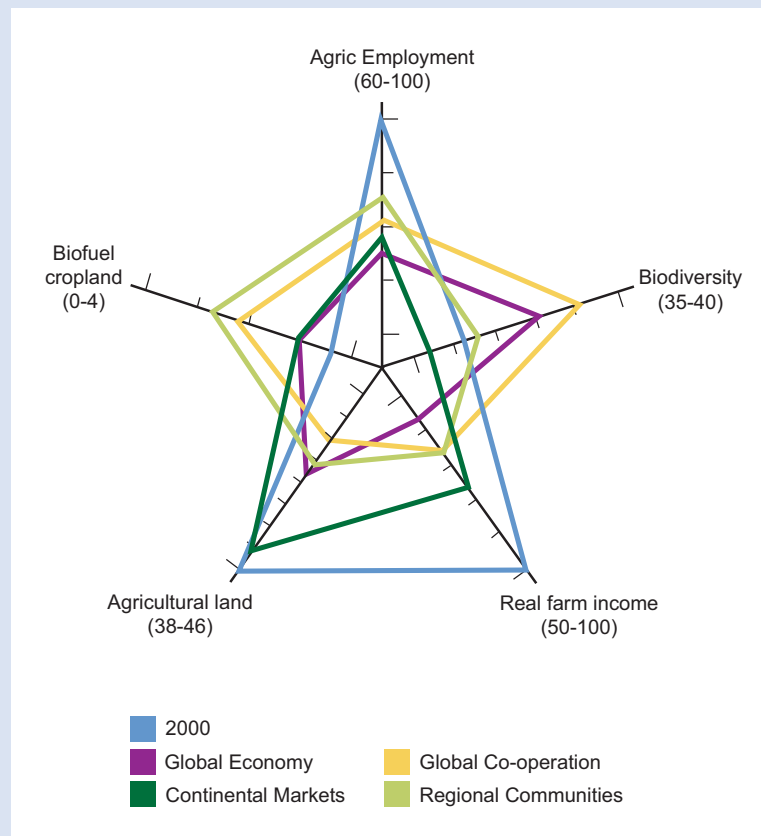


Figure 2. Indicators for the four baseline scenarios in 2030 and the line for the year 2000.

### EU policy: facilitate trends or anticipate future opportunities

When comparing the differences between the scenarios with the impact of EU strategic policy options within scenarios, it is possible to see that the variation between the scenarios is much greater than the variation between extreme settings of a given policy option within a scenario. This will be explained on the basis of two examples of EU strategic policies.

### Example 1 - Biofuels policy

The differences of three policy options concerning the ambition on biofuel production within the Global Economy scenario is illustrated in Figure 3. The yellow line is the baseline option for the Global Economy scenario (A1) without a blending obligation for biofuels (0%). The light-blue line indicates a 5.75% blending obligation and with the dark blue line the high ambition of 11.50% blending of first generation biofuels in transport fuels is indicated. The first thing one can derive from Figure 3 is that policy has a significant impact; the indicator values differ for the three policy options. For example, especially the high ambition of 11% blending has a large impact on the area of biofuel cropland. The other indicators are affected only modestly in comparison to the bandwidth between the four baseline scenarios. The agricultural employment is raised by only one point when changing from no ambition to high ambition in this policy field. This is small compared to the band width of almost ten points between the four baseline scenarios.

In summary, a high ambition regarding biofuels production keeps more agricultural land in production, stimulates farm income, reduces biodiversity and sustains farm employment. However, this policy is not able to stop general trends of decreasing agricultural incomes and employment.

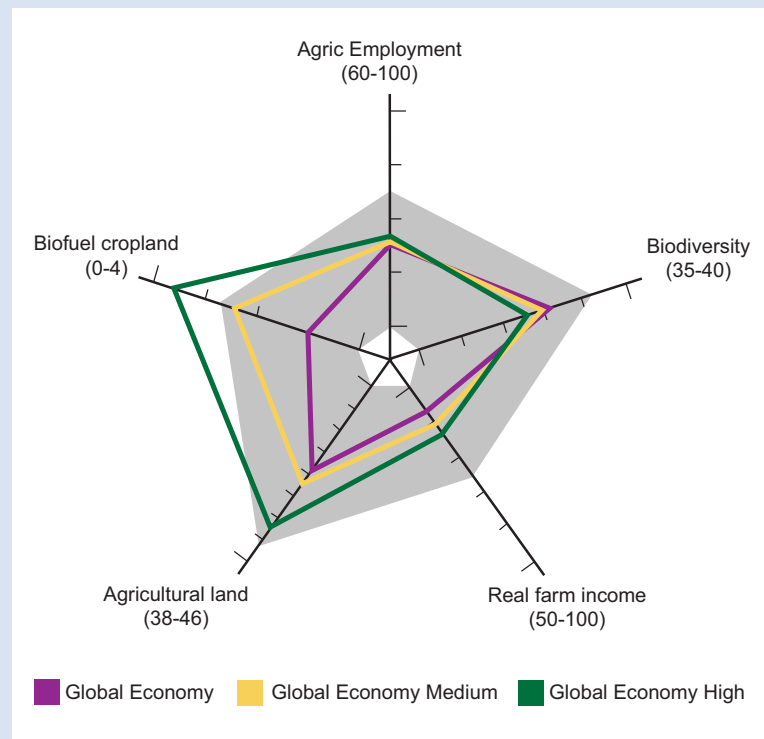


Figure 3. Impact of different ambitions of the Biofuels Directive within the Global economy scenario for the year 2030.

## Example 2 - CAP income support

The impact of three different levels of income support for the Regional Communities scenario for the year 2030 is illustrated in Figure 4.

In general, more income support leads to more agricultural land in production, more income and employment for farmers and a lower biodiversity index (because less land will be abandoned). In the scenario with more Income Support, the agricultural employment indicator is 1.5 points higher in comparison with the option with the lowest income support. The difference between the four baseline scenarios was almost ten points (Figure 2), indicating that global forces have a larger impact than policy measures. Policy measures can slow down but not reverse the trend.

### Modest impact of policy

Both examples show that EU strategic policy certainly can affect indicator values. With strategic policy measures the EU can steer indicators in a desired direction. Overall, one could say that the impact of policy in general is modest for many indicators compared to the overall band width between the baseline scenarios. The combination of other factors – especially those of the three main driving forces – are generally much more important.

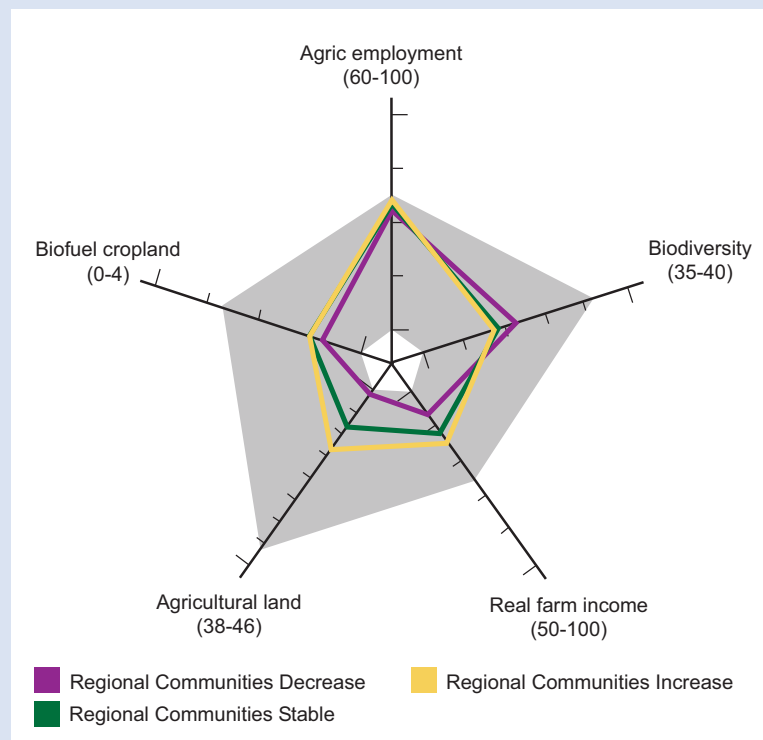


Figure 4. Impact of different ambitions of the level of CAP Income Support within the Regional Communities scenario for the year 2030. The index value for the employment indicator is 100 in the year 2000.

# Changing role of farming

**In the EU12 (new Member States) the significance of agriculture for the economy is likely to decline rapidly over time in all scenarios towards the level of the EU15, leading to a significant decrease in agricultural employment. This is despite the fact that the volume of agricultural production is rather stable across all scenarios. The relative importance of farming for the total economy is already small in the EU15 (old Member States). Apart from its economic value, farming remains above all important for the use and management of the land and the environment.**

## Small share in GDP

The current trend, of the decreasing relative importance of primary agriculture in the total economy, is likely to continue towards 2030 in all scenarios. The higher the prosperity level in a country the more important industry and services become and the smaller the share of the agri-food complex and primary agriculture. This is not only caused by people spending less (in percentages) of their total income on food, but also because the production efficiency increases quicker in the agricultural sector in comparison to other sectors.

The latter effect results in declining agricultural prices, relatively to the general price index, but people will not spend more on food when it gets cheaper (a low price elasticity of demand).

The share of agriculture is already low in north-western Europe, with agriculture having a share of less than 4% of total GDP in many regions (see Figure 1). The declining share of agriculture in GDP in many regions in 2030 is represented in Figure 1 by an increase in white areas. In 2000 and 2030, the highest levels of agricultural share in GDP are located in south-eastern parts of the EU.

## Agriculture remains the dominant land-use

Due to increased efficiency, analogous to the declining role of agriculture in the economy, the agricultural area will decline as well (see Figure 2). The process of diminishing agricultural area has been ongoing for decades. However, the decline in production area is much smaller than the decline of the agricultural share in the total economy.

In 2000, still over 46 percent of the EU land surface was used for agriculture. Although in the future current trends will most likely continue, agriculture will remain the most important use of land. The four scenarios show that between 40 and 45 percent of the land in the EU will remain in agricultural production.

Land use and land management are deciding factors for the structure and appearance of the European landscapes. Both are important drivers of many environmental processes and therefore exert a major influence on issues such as biodiversity, nutrient balances, water use and carbon sequestration.

## Different policy approach?

From the simulations it can be observed that the share of agriculture in the economy is likely to rapidly decline. Additionally, the area used for agricultural production may decline, but at a slower rate. The contribution of agriculture to the management of the land, the landscape and the environment might result in a more explicit consideration of these themes within future agricultural policies.

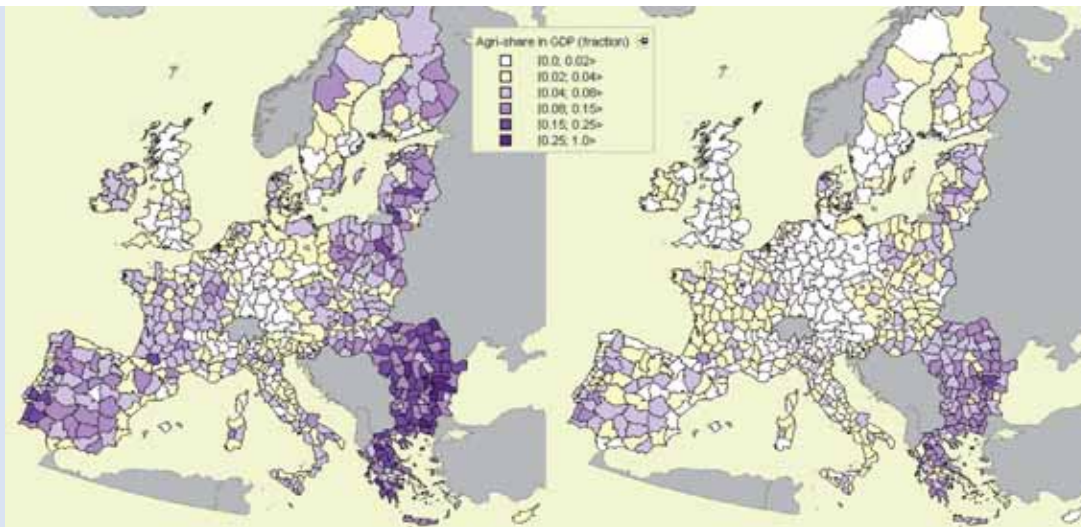


Figure 1. Share of primary agricultural production in regional GDP in the year 2000 (left) and the year 2030 (right) for the Global economy scenario.

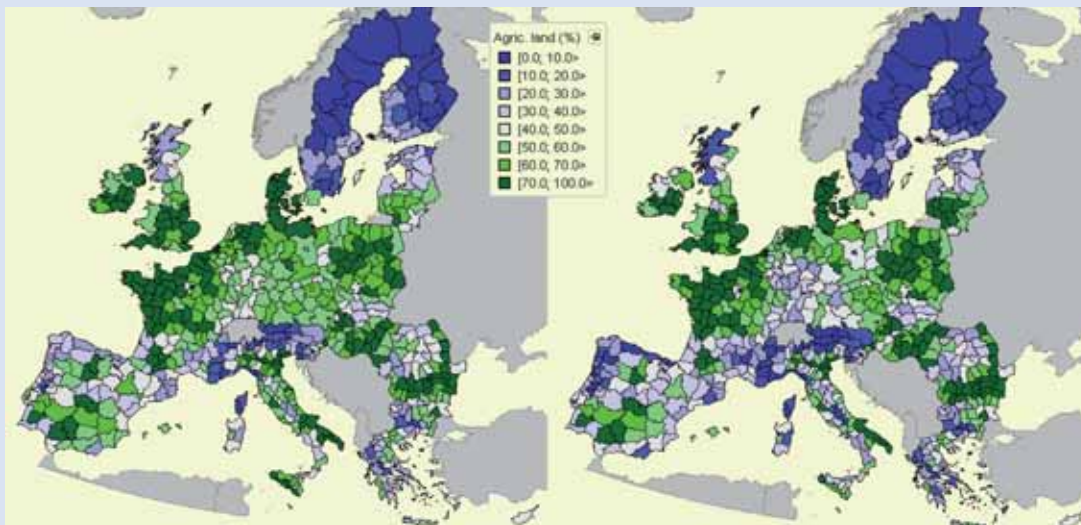


Figure 2. Share of agricultural land of the total regional land surface in the year 2000 (left) and the year 2030 (right) for the Global economy scenario.

# Agricultural abandonment offering new opportunities?

The Eururalis simulations show that agricultural abandonment is the most important land use conversion in the EU27. Abandonment of agricultural land occurs in all scenarios and it ranges from 2 to 13 percent of the agricultural area. This means that roughly between 3.5 million hectares (comparable with the agricultural area of Czech Republic) and 25 million hectares (total agricultural area of Denmark, Germany and Hungary together) of agricultural land may become abandoned between now and 2030.

## Major impact especially in liberalisation scenarios

In Europe land abandonment is the most important land use conversion. A large area is likely to be affected by land abandonment, which will have a major impact on various aspects such as economic viability, biodiversity, landscape, carbon sequestration and erosion. This impact can both be positive and negative.

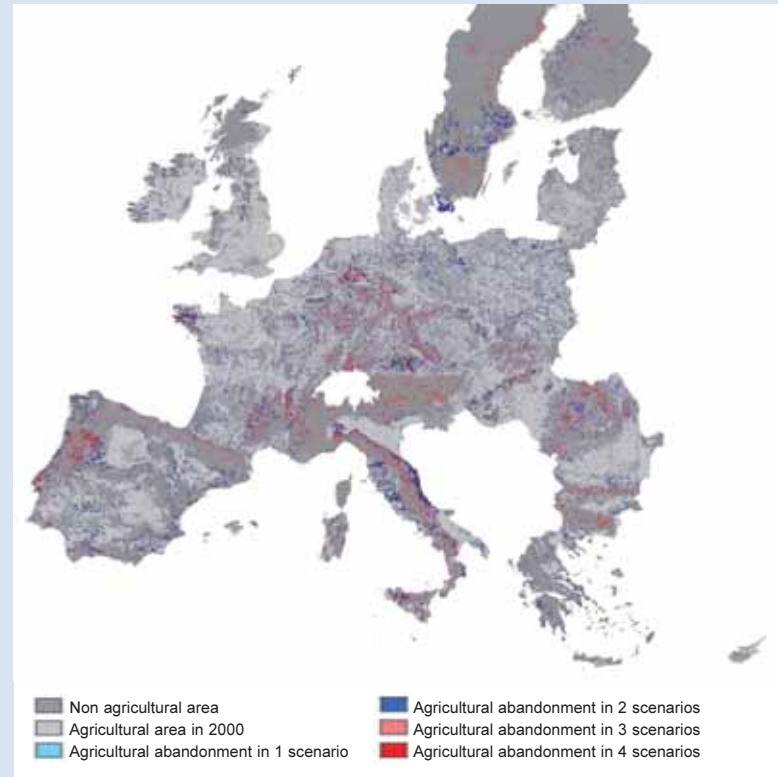


Figure 1. EU hotspot map indicating areas that face agricultural abandonment.

Land abandonment occurs in all four scenarios. In the two liberalized scenarios Global Economy and Global Cooperation abandonment takes place on a large scale; for more than 12% of the agricultural area of 2000 land use will be

abandoned by 2030. This is a continuation of trends in the past. The Continental Markets scenario has a more regional focus and strives for more protection of agriculture. In this scenario, a much smaller amount of agricultural land is abandoned.

Especially land in the marginal areas in the EU15 will be abandoned. Although policies can not reverse the ongoing trend, maintaining CAP and stimulating production of bio-fuel crops can reduce the amount of abandoned land on average by 50%.

### Time for discussion

The degree of abandonment of agricultural land legitimizes high attention of EU policy makers. Abandonment currently just seems to 'happen' in some marginal regions in the periphery of the EU. In reality, land abandonment is not (yet) clearly visible in many regions, due to the inertia of land-use change resulting from land-ownership and socio-economic characteristics. Fields are still extensively maintained by part-time farmers whose main source of income is already outside primary agriculture. Only with change of generations the extent of the issue may become visible.

The map in Figure 1 illustrates which regions are likely to be affected by land abandonment according to Eururalis calculations. It clearly shows large regional differences within the EU. The red coloured regions are facing abandonment in at least three out of four scenarios. This suggests that regardless of the scenario and the associated policy measures, these regions will probably be affected by land abandonment. On the short term, input of subsidies will maintain farming in these areas, but on the longer term these regions dangle at the end of the rope. Additionally, the continuing increase in productivity efficiency per hectare, combined with the relatively small increase of food demand in the EU, will always increase the competitive strength of regions well suited for agriculture above marginal areas.

The lighter grey regions represent current farming areas which are not threatened by abandonment. These areas are expected to have a stable agricultural land-use notwithstanding that large changes in agricultural structure and decreasing farm numbers may continue. The blue areas face abandonment in one or two scenarios. For agricultural land in these regions, policy can make a difference for future land-use.

### Consequences of abandonment

Agricultural abandonment is often seen as negative. It leads to:

- The loss of typical agricultural landscapes when open farming landscapes will partly change towards natural vegetation;
- The loss of agriculture related biodiversity, especially when extensive traditionally managed farming systems disappear;
- The loss of employment, not only directly after farmers move out of business but also in the rest of the agribusiness;
- Lower regional income and disappearance of the farming culture.







### Adjusting policy focus on new opportunities

Instead of only attempting to slow down the abandonment process, now is a good time for a fundamental discussion with a focus on new opportunities.

Eururalis simulations indicate, that in certain regions policies can influence the extent of agricultural abandonment. Stimulating biofuel production and extra subsidies within the CAP, reduce the amount of abandoned land. For instance in the Global Economy scenario, increasing the ambition regarding mandatory blending of biofuels from 0% to a high ambition of 11% would reduce the agricultural land abandonment in the 2000-2030 period from almost 9% to less than 4% respectively. EU strategic policies on CAP and biofuels are likely to affect the marginal areas somewhat indirectly, because EU-wide more land will be kept in production. More direct ways to stimulate competitive farming in the marginal areas could include integrated high-tech (GPS; virtual electric fencing) and large scale livestock farming combined with specific market branding of EU free-range produced beef.

Multiple useful functions can be allocated to abandoned agricultural land in marginal regions, such as nature, biofuels plantations or urbanization. By designating the land to these functions competition for land in other regions may diminish. Therefore spatial and environmental planning should be key aspects in this discussion.



### To conclude

Eururalis scenarios – as well as other scenario studies<sup>4</sup> – suggest that the trend of agricultural land abandonment, which already started after world war one, can in the long run not be avoided for many regions in Europe. Only the incorporation of even more ambitious bio-energy policies than assumed in the current Eururalis scenarios, seem to be able change the general picture of agricultural abandonment in the EU. Instead of passively observing the land abandonment trend, a pro-active steering and a long term policy vision is required on EU level. This can allow for developments to be directed in a more favourable way.

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<sup>4</sup> Prelude, EEA and Scenar 2020.

# EU12 catches up, but remains behind

**Income growth rate in EU12 countries is higher than in EU15 countries. Despite this the income differences will not disappear in the near future. Structural changes in the EU12 are larger than in the old Member States. In this process of change a large amount of agricultural labour will become redundant. The question is whether the economy in the EU12 will be able to absorb this surplus labour. Considering the overall growth of the EU12 economies, this will probably not be the case for the majority of regions in the EU12.**

## Falling share of agri-food

The share of agri-food complex in the economy continues to decrease in all scenarios for 2030 compared to 2000. The higher the prosperity level in a country the more important industry and services become and the smaller the share of the agri-food complex. Important underlying factors for the ongoing trend include: (a) the fact that people do not eat much more as their income grows and (b) the high rate of technical progress. Both characteristics lead to a decline in the real price of agricultural commodities and therefore agricultural income. To obtain real wages conform the market in the future, farmers may increase the scale of production, increase the quality of their products or engage in other activities (e.g. part-time farming, tourism). Faster economic growth leads to a lower share of the agri-food complex and a higher rate of structural change.

## EU12: large structural change

The structural change process in agriculture is a long-term process that continues in all scenarios *with or without* policy changes. This structural change process includes a declining share of agriculture in GDP, and a declining number of people working in agriculture, both in absolute terms and as a proportion of the total workforce. Farm units will decrease in number, while the average farm size will increase. The impact of these trends will continue to have drastic effects especially in the EU-12, because their typical national features include a high

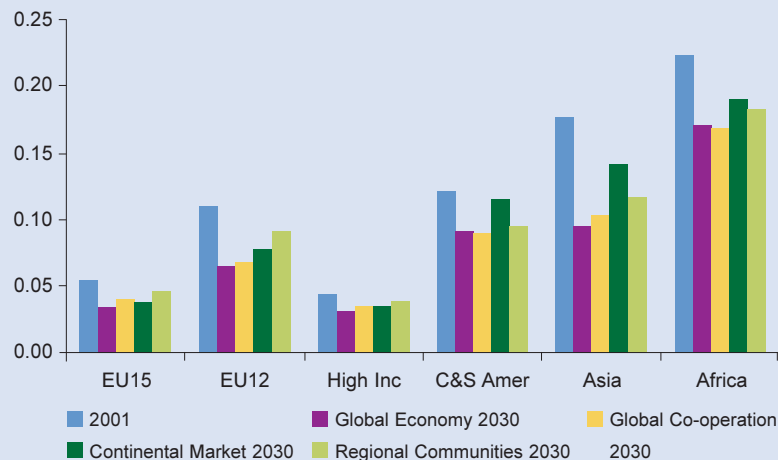


Figure 1. Indicator share of GDP of the activities in the agri-food sector.

share of agriculture in the GDP and employment, and a high number of small farm units.

## Leading and lagging regions

The picture of changes in employment opportunities<sup>5</sup> in rural regions, resembles a mosaic of leading, in-between and lagging regions. Additionally, quite a number of rural regions even outperformed the urban regions in the increase of employment opportunities. The existence of dynamic rural regions showed some evidence that the association of rural as being the scene of job and population

<sup>5</sup> See, OECD 1996, Terluin and Post 2000, Bryden and Hart, 2001.

losses, needs re-adjustment. In addition, agriculture can no longer be considered to be the backbone of the rural economy: even in the group of the most rural regions, agriculture employs only one fifth or less of the regional labour force (Table 1).

### Redundant labour and absorption

In general the importance of the agricultural sector declines in terms of contribution to GDP, employment and income. Whether this might lead to unemployment, lower wages or depopulation in some regions is dependent on the opportunities and developments outside the agricultural sector. In this section, we identify a regional typology that identifies regions that might struggle in the future. We focus on two effects:

1. *Redundant agricultural labour effect.* The amount of labour becoming redundant in agriculture. The absolute change in the share of agriculture in GDP (Figure 2) between 2001 and 2030 is used as a proxy.

Table 1. Share of agriculture in total employment in the EU25 regions, 2004 (% of total).

	Most rural regions	Intermediate rural regions	Most urban regions	National average
European Union 15	10	5	2	4
New Member States	20	13	2	12
European Union 25	12	6	2	5

Source: Own calculations based on Eurostat, Luxembourg.

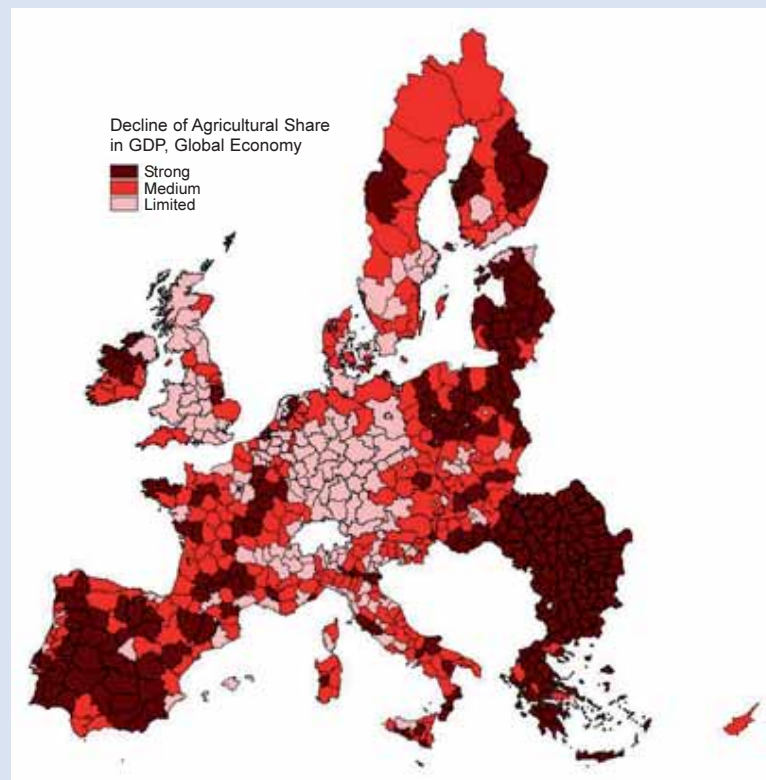


Figure 2. Change in agricultural share of GDP (2001-2030), Global Economy.

In the Global Economy scenario, the share of agriculture in GDP strongly declines. The decline is lowest in the central part of Europe and highest along the borders of the EU (Eastern Europe and parts of Southern and Northern Europe).

These regions are currently characterized by a high initial agricultural share and/or high economic growth.

2. *Absorption effect.* Is the rest of the economy able to absorb labour released from agriculture? The total increase in employment opportunities in a region is used as proxy (Figure 3). If a region performed above average in the past (leading) we assume that it can more easily absorb the surplus agri-labour. Vice versa for regions which performed below average in the past (lagging), it is assumed that they can less easily absorb the surplus agri-labour.

Leading and lagging regions are defined according to their historical performance since 1990. The criteria 'leading' or 'lagging' are calculated relative to the national average employment growth rate since 1990.

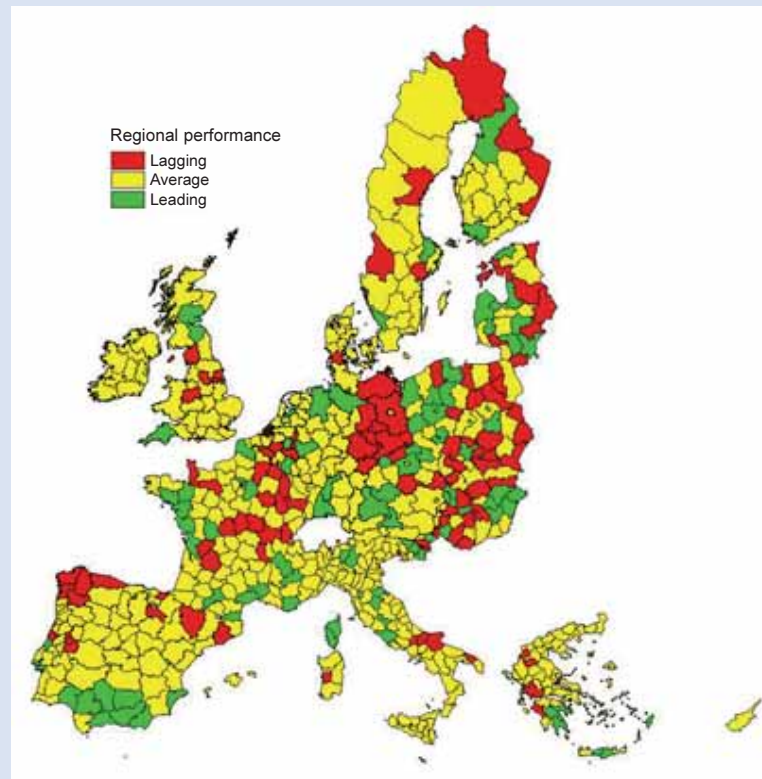


Figure 3. leading and lagging regions in terms of employment growth.



### Regional clusters

Combining the two criteria leads to the following regional typology (illustrated in Figure 4). The green colours indicate that regions are expected to more easily absorb the released agricultural labour. The purple red colours indicate regions where the released labour might cause regional problems such as unemployment.

The results of the Global Economy scenario suggest that many regions in Eastern and Southern Europe might encounter problems in coping with the decline of agriculture in their region. The surplus of agricultural labour in EU-12 may not be easily absorbed because of a parallel decline in manufacturing employment and a slow rise in services employment. Under these circumstances, structural change in these regions can lead to lower income, “hidden unemployment” and migration to other regions. Absorption of the extra labour forces may require additional education and requires flexibility from the people. Policy tools (e.g. education, diversification) can contribute to facilitate the changes in agricultural employment and the regional absorption of labour.

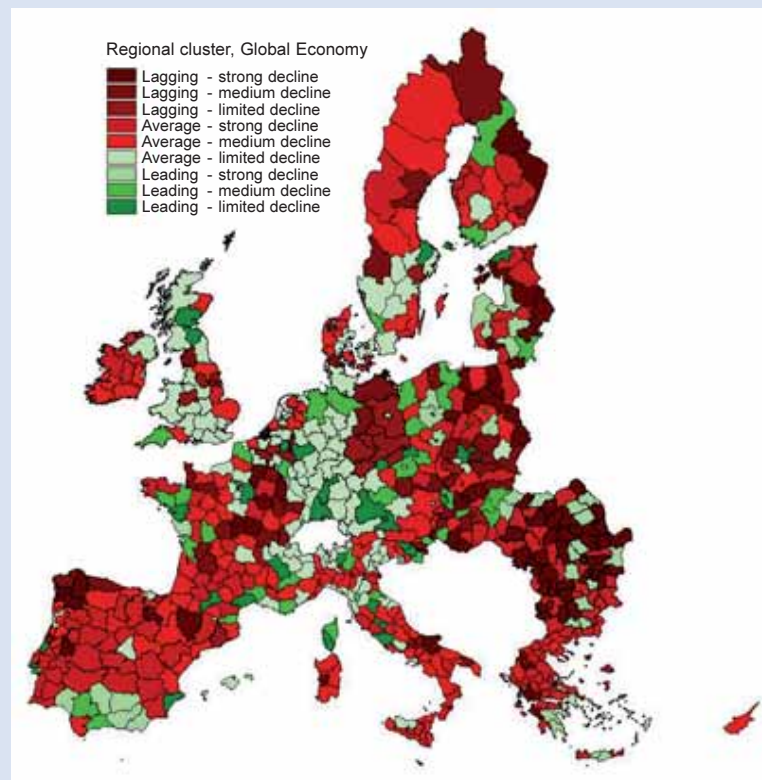


Figure 4. Regional clusters, Global Economy.

# Environmental challenges for future livestock production

In Europe, a number of hotspot regions of livestock production are present. Currently, the highest concentrations of livestock per square kilometre of agricultural land can be found in The Netherlands, north-western parts of Germany, Belgium, Northern Italy, north-eastern parts of Spain, Denmark and Ireland. These countries have a since long accommodated intensive livestock system, especially for poultry and pigs. These livestock hotspots pose potential environmental risks, e.g. pollution of the air, soil or water. Strict implementation of EU environmental policies on for instance nitrogen emissions and water quality are attempts to limit environmental risks.

Concentration of livestock in specific regions can offer economic advantages, since it facilitates an efficient supply chain. There are also regions that currently have very low livestock densities. In these regions increasing livestock numbers might enhance farmers' income and offer new opportunities. For instance in regions with a high production of arable crops or upcoming biofuel production, additional livestock might create opportunities for a more closed nutrient cycle by supplying nutrients via excreta or using by-products (e.g. protein cakes) as animal feed.

Figure 1 illustrates the current distribution of livestock throughout the EU, and Figure 2 illustrates the sensitive areas known as the Nitrate Vulnerable Zones (NVZ). Comparing both maps indicates that some hotspots of livestock production are situated within the NVZ and therefore these hotspots may not be sustainable in the long run from an environmental point of view.

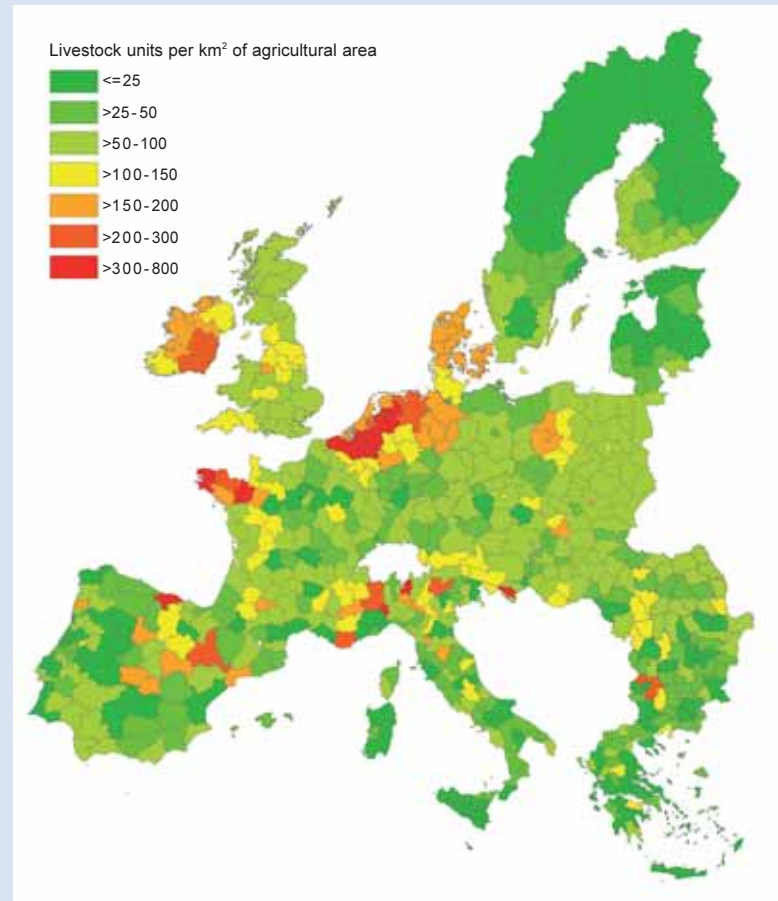


Figure 1. Livestock densities in 2030 per region for the Global Economy scenario.

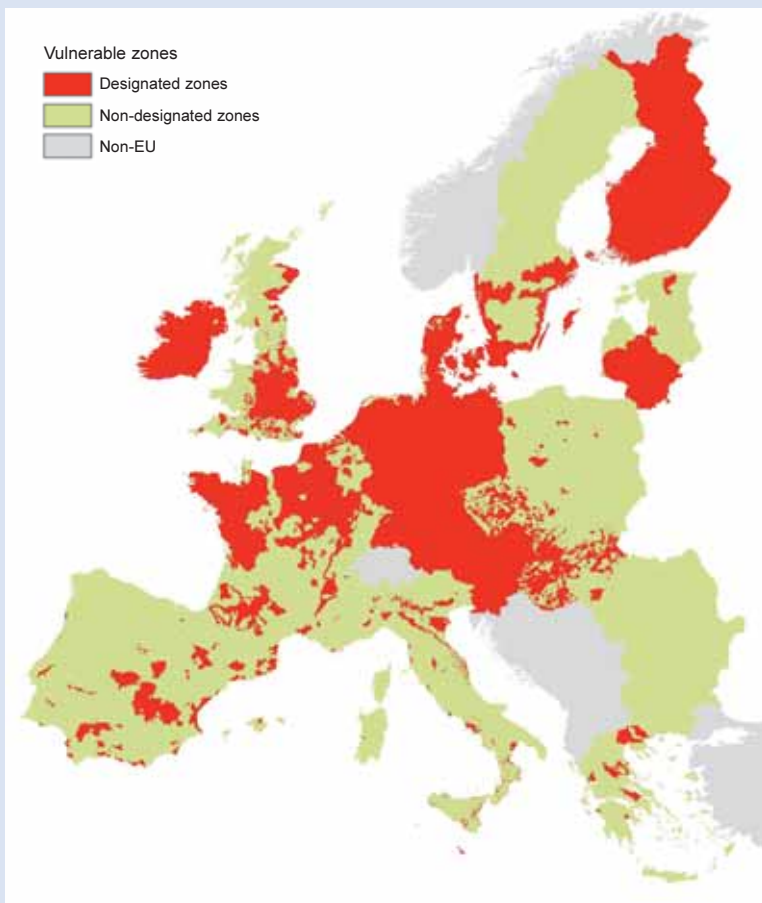


Figure 2. Nitrate Vulnerable zones used in Eururalis 2.0 (source JRC<sup>6</sup>).

Eururalis 2.0 results show that livestock production will remain concentrated around the current hotspots. This will probably result in future conflicts with environmental legislation (Nitrates Directive, Water Framework Directive) of the EU. The current modelling framework does not yet incorporate the effect of more strict environmental legislation. To date, livestock production and allocation has mainly been driven by economic factors.

Simulations indicate intensive livestock production areas will not be inclined to reallocate spontaneously. Given the current spatial configuration, this suggests that the stakes in future conflicts between intensive livestock production on the one hand and environmental interests on the other hand are likely to increase. Policy measures might help to stimulate a different direction for developments.

Further elaboration of the Eururalis framework will take into account more strict environmental policies and/or a technological transition that might help meeting the environmental targets in the future. Especially in the governmentally steered scenarios Global Cooperation and Regional Communities strict environmental legislation is likely to be implemented and is expected to lead to a significant spatial reallocation of livestock production.

<sup>6</sup> The Nitrate Vulnerable Zones map is a policy map which is still under debate and which might have altered or will alter in future. The map used is of September 2006 and was developed at JRC.

# Will biofuels change the landscape?

**The European Union aims to increase the share of renewable energy in its total energy consumption. This in order to reduce greenhouse gas emissions and make the economy more CO<sub>2</sub> neutral. Other motives to increase the use of bio-energy include: reduction of the dependency on fossil fuel imports and stimulation of rural development and the agricultural sector.**

## Ambitious targets

Ambitious goals have been set by the EU for the transport sector: the minimum share of biomass or other renewable transport fuels in the total EU fuel consumption had to be 2% in 2005 and must be 5.75% in 2010. For 2020 the EU target has been set at 10% under the condition that the so-called 2<sup>nd</sup> generation techniques will be available then. Currently, bio-energy is produced from both waste material and biofuel crops using first generation techniques. To meet the ambitious future targets large scale production of biofuel crops in Europe will be necessary.

## Smaller income loss

Apart from the direct impact of an increase in biofuel demand on crop prices and crop production, the changes in agricultural income are significant. The income losses from agriculture will be a bit smaller under the scenarios where the biofuel directive is in place. The positive development in incomes is mainly caused by higher agricultural prices. Outside the EU, agricultural income increases in Africa, Asia and South and Central America.

The impact on agricultural income is most profound in both regionalization scenarios, i.e. Continental Markets and Regional Communities. In these scenarios, the emphasis lies on production of biofuel crop within the EU, whereas in the globalization scenarios (i.e. Global Economy and Global Cooperation) imports will be of much more importance.

*Table 1. Agricultural income in the EU in the year 2030 for the baseline scenarios with and without the biofuels directive (index: 2000 = 100).*

	Global Economy	Global Co-operation	Continental Markets	Regional Communities
Without biofuels target	58.3	64.3	76.8	61.9
With 5.75 biofuels target	60.2	66.1	86.2	67.5

## Environmental side effects

The large-scale agricultural production of biofuel crops can have important environmental side-effects. These crops need scarce resources, e.g. land, water, and agricultural inputs, e.g. fertilizers and pesticides. This will have an impact on the landscape, on the environment (e.g. CO<sub>2</sub> balance, erosion) and on the biodiversity.

The geographical location and spatial arrangement of biofuel crops will greatly determine the actual environmental impact of these crops. The impact will be more severe in regions with a high ecological or landscape value.

Within the Eururalis project, a model has been developed to explore the spatial distribution of biofuel<sup>7</sup> crops. This model provides insights into which land-use types are likely to be replaced by biofuel crop production, and the geographical location and distribution patterns of biofuel crops EU wide under the different scenario assumptions.

<sup>7</sup> The Eururalis biofuels-model is limited to biofuel crops used for the production of either biodiesel or bioethanol. Both types of crops are grouped together in the model as 'biodiesel/bioethanol crops'. So-called 'biomass' or 'second-generation' biofuel crops are not considered.



## Geographical patterns

The area of biofuel crops in each region in 2030 as a percentage of the total area of that region is illustrated in Figure 1. The total area used for biofuel crops differs substantially between the scenarios. A comparison of the area required for biofuel crop production within Europe is given in table 2.

Table 2. Area of biofuel crops in EU15, EU12 and EU27 in million hectares. In addition, the total land area of each region is given.

	Global Economy	Global Co-operation	Continental Markets	Regional Communities	land area Total
Biofuel targets	0%	5.75%	0%	5.75%	-
EU15	3,5	6,4	4,3	8,8	325,3
EU12	1,6	4,2	1,4	3,7	109,1
EU25	5,1	10,6	5,7	12,5	434,4

The area of biofuel crops is substantially larger in the Global Cooperation and Regional Communities scenarios than in the Global economy and Continental markets scenarios. This is caused by the assumption in the first two scenarios that EU regulations require Member States to include a significant share (of 5.75%) of biofuels in their total fuel transport consumption. This in combination with the desire to be self-sufficient results in a large area for biofuel crop. As such regulations are not assumed in the Global economy and Continental markets scenarios, the demand for biofuels is much lower in these scenarios. Still biofuels will be grown in these scenarios as an alternative energy source.

In both scenarios with EU biofuel regulations, most of the 'extra' biofuel crop production is allocated in the Northwest and the Eastern part of Europe. These parts comprise also the countries that are currently cultivating a high share of

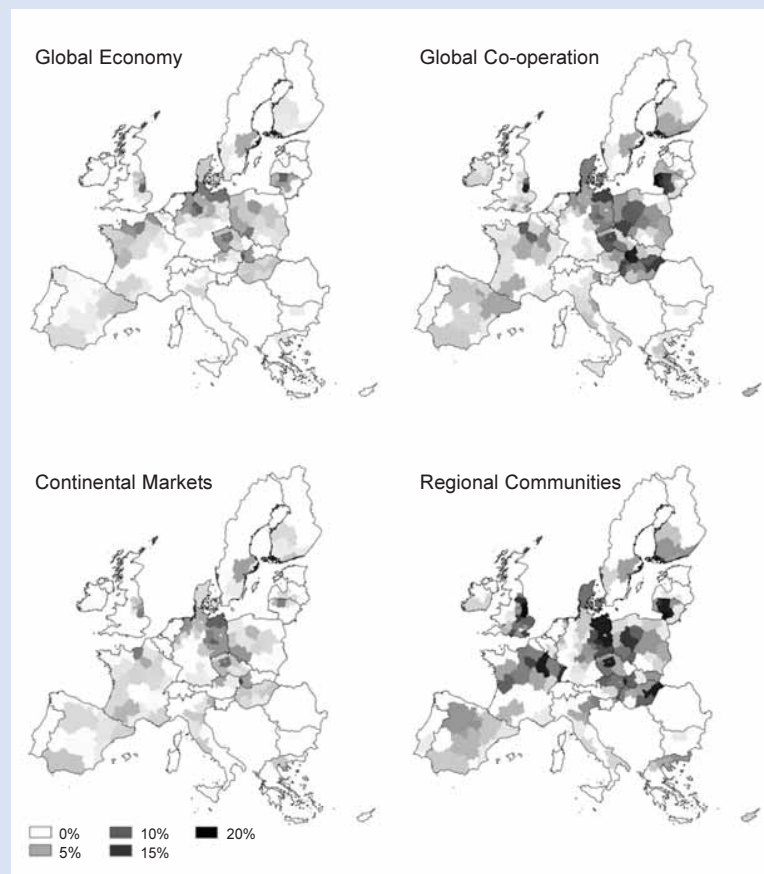


Figure 1. Biodiesel/bioethanol crop cultivation in each region in 2030 (given as percentage of total land area).



these crops and which are suitable for these cultures. Large areas of biofuel crops are allocated in Eastern-Europe due to the low labour costs and the agricultural potential in these countries. Besides a lot of biofuels will be imported even in the regional oriented scenarios (see Chapter on 'EU policy leads to global trade offs').

### Differences between the Eururalis scenarios

There are some spatial distribution differences in the biofuel crop production between the scenarios: e.g. in the Global economy scenario, biofuel crops in Germany are primarily allocated in the north-western parts, where there are many international harbours. This is also the case in France, where biofuels are primarily allocated nearby harbours or areas rich in petrochemical industry. In the other scenarios, biofuels are located more inland. This is consistent with the expectation that in the Global Economy scenario a larger share of the feedstock for the processing plants will be imported from abroad, whereas for instance in the Regional Communities scenario objectives are more focused on crop production within the EU.

### Hotspots of biofuels production

Despite the (important) differences between the scenarios, the same countries will experience the largest increase in biofuel crop production. Also within these countries a number of regions can be discerned that show the highest growth in biofuel crops in all the scenarios. At all of these regions typically a well-developed infrastructure is present as well as large areas of suitable arable land. In these potential 'hotspots' in Europe for biofuel crop cultivation substantial areas of biofuel crops emerge in all scenarios (Figure 2).

These hotspots of biofuel crop production in the EU27 include: NE-Germany, parts of Poland, Lithuania, Czech Republic, agricultural areas around Paris, and around the border area of Slovakia, Hungary and Austria. In these regions, biofuel crops will most certainly change the landscape.

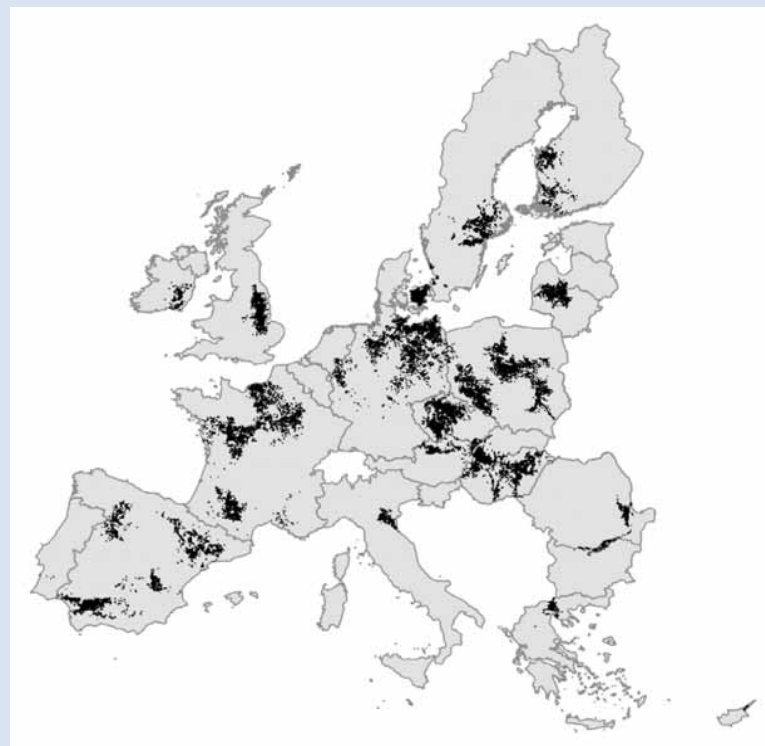


Figure 2. Potential hotspots of biofuel crops in 2030: i.e. locations where biofuel crops are allocated by the Eururalis biofuels model in all 4 scenarios.

# Changes in CAP policies imply higher income and less production effects

**Changes in policy measures and subsidies can have several direct and indirect consequences. Agricultural production is more affected by the reduction of border support (import tariffs and export subsidies) than by reduction of domestic income support. On the other hand, reducing domestic income support has a larger impact on farm income than the reduction of border support.**

**This supports the view that the current shift from border to income support is less production distorting from a production / trade point of view, and is better in terms of preserving a stable income for farmers. Reducing the CAP, therefore, has a rather limited impact on production, but a high impact on agricultural income, farm size and land prices.**

## Past developments of the CAP

EU agriculture and the agri-food sector are greatly influenced by international policy developments. After World War II the EU established a Common Agricultural Policy (CAP) that kept prices above world market levels (e.g. the intervention prices on cereals). CAP stimulated agricultural production and led to budgetary problems and disagreements between the EU and international partners. The EU had to respond to these problems several times in the last two decades of the 20th century. The MacSharry reform in 1992 and the Agenda 2000 reform of 1999 both effectuated a shift of the CAP from market price support to income support. Intervention prices for wheat and beef were substantially reduced, and farmers were partly compensated by area and animal premiums.

## Reforms and enlargement

The recent CAP reform of 2003 in particular reduced the intervention prices of dairy products. Income supplements were again used in order to compensate for the reduction in the guaranteed prices. However, the compensatory payments

were further 'decoupled' from production by the introduction of a single farm payment. On the trade side the most important impact is the enlargement of the EU to 27 Member States. Conform the Single European Market, trade distortions will be eliminated within the enlarged EU. These existing policies are included in all the scenarios. The most important changes in CAP and trade policies in the scenarios are, that in the Global Economy and partly in the Global Cooperation scenario, all CAP and trade policies are abolished.

## EU15 - Old Member States

Figure 1 shows that in EU15 the increase in production growth for protected products under CAP (grains, oilseeds, sugar, beef and dairy) is low in all scenarios<sup>8</sup>. It is only positive in the Continental Market scenario, where macro-economic growth is high and CAP and trade policies remain intact. Reduction of border support has a significant negative impact on production in the globalising scenarios (Global Economy and Global Cooperation) where all border support is abolished. The impact of reducing domestic support is less pronounced, indicating that a shift from market price to income support is indeed less production distorting.

## EU12 - New Member States

Accession to the European Union has a positive impact on the production of protected commodities in the EU12, especially in the Global Economy and Global Co-operation scenarios. In these scenarios, the predicted increase of the production of protected products is higher than for non-protected products. For the regionalization scenarios (Continental Market and Regional Communities), the

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<sup>8</sup> For protected products we give the total production effect, which is the result of all scenario's assumptions. Furthermore, the isolated contribution of changes in border support, domestic support and all other factors are depicted.

impact of changes in border and domestic support is more important for production. Benefits of accession to the EU15 are less eroded by liberalization, because CAP payments are not reduced or even increased (Regional Communities) and access of other countries to the EU is not enhanced.

### Effects of liberalization

The process of liberalization has a greater impact on agricultural income than on agricultural production and land use; this fact consolidates the structural pressure throughout Europe to decrease labour in farming and to increase the average farm size. The most obvious effect of liberalization will be the faster decline in the number of farms in the EU, and to a lesser degree the rate of decline in the area of land used for agriculture; overall production will in general also decrease. In the case of beef and poultry, the decrease in production will be substantial. In contrast, some sub-sectors of agricultural production, such as cheese and pork, will increase regardless of the liberalization process.

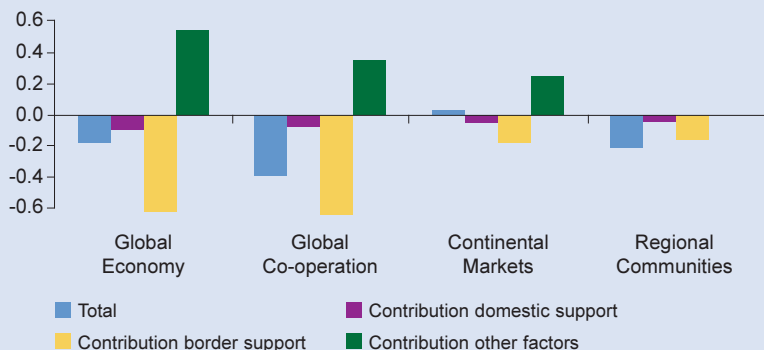


Figure 1. EU-15 Production of Protected Products: Total Effect and the Contribution of Domestic and Border Support and other factors, annual growth rates, 2001-2030.

### Wages in agriculture will continue to lag behind

The general trends in factor markets (i.e. labour, capital and land market) include a decrease in agricultural employment opportunities and an increase in the capital intensity of agricultural production. On average the income generated by agricultural activities continuously increases, but it still lags behind in comparison to other economic sectors. The differences in wages between agriculture and non-agriculture can be sustained in many countries through limited off-farm labour migration. General trends in factor markets (capital, labour and land) are only partially affected by policies, except for agricultural land prices, which decrease in the context of liberalization. Declining prices of agricultural land imply lower asset values for the landowners. This can seriously affect the livelihoods of landowners that are heavily indebted.

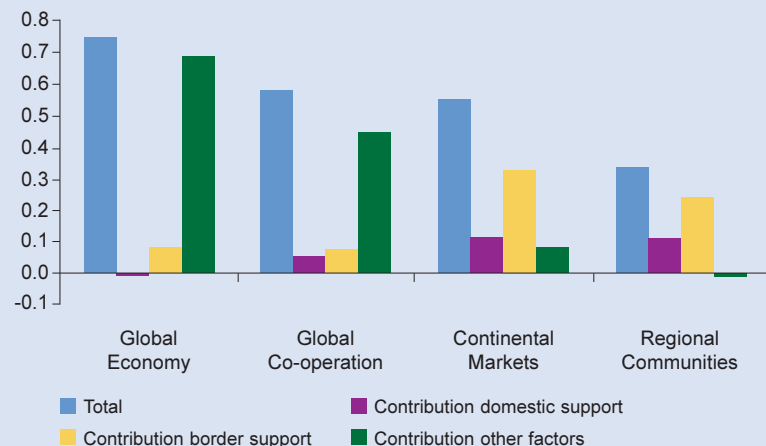


Figure 2. EU-12 Production of Protected Products: Total Effect and Contribution of Domestic and Border Support and other factors, annual growth rates, 2001-2030.

# EU biofuel policy leads to global trade-offs

Without mandatory blending the targets of the current EU Biofuel Directive (BFD) will not be met, let alone new initiatives from the European Commission to meet the 20% share renewables in 2020. Mandatory blending of 1<sup>st</sup> generation biofuels has a strong impact on agriculture at a global and European level. The long term trend of declining real world prices of agricultural products slows down or may even be reversed. The incentive to increase production in the EU will tend to increase land prices and farm income in the EU, but also in other world regions. The EU will not be able to produce the feed stocks needed to produce the 1<sup>st</sup> generation biofuels according to the BFD domestically, resulting in larger agricultural trade deficits. Due to import of biomass for biofuel from outside the EU, crop production expands in other highly industrialized countries and especially in South America (Brazil). Globally, this will put extra pressure on land resources and biodiversity.

## Mandatory blending

Ambitious goals have been set by the EU Biofuel Directive (BFD) for the transport sector: the minimum share of biomass or other renewable transport fuels must be 5.75% in 2010. In January 2008 the European Commission will release its policy package, in which an obligatory target is expected for the total share of renewables in 2020 (20%). For the transport sector, a target of 10% is expected. This target can only be met by biofuels, although it is unclear whether the 10% target will be kept in place if only 1<sup>st</sup> generation biofuels are available. In Eururalis simulation are only performed with 1<sup>st</sup> generation biofuels, assuming 2<sup>nd</sup> generation biofuels will not be available commercially before 2020. Sugar- or starch-containing crops like sugar cane or cereals (to produce bio-ethanol) are considered 1<sup>st</sup> generation biofuels; lignocellulosic crops like woody biomass are considered 2<sup>nd</sup> generation biofuels.

## Increasing competition between Food, Fuel and Forest:

Land is needed for food production, for biofuel cultivation and for nature conservation. In the past decades land resources seemed abundant in the EU countries. The food crop area in Europe has diminished gradually over time and at the same time the protected areas of nature have increased. However, in the coming decades, with a rising global demand for food, fodder and biofuels this trend might change. Food, fuel and forest (i.e. biodiversity) might compete over scarce land resources.



Even without the mandatory blending, the share of biofuels in fuel consumption for transportation purposes will increase, but it will remain below the target value of 5,75%. This endogenous increase in biofuel production is due to the fact that the ratio between crude oil price and prices for biofuel crops is expected to change in favour of biofuel crops. Under the *Global economy* (without BFD), biofuel shares in the total fuel consumption increase (see Figure 1). The highest increase is in the already integrated market of Brazil where the initial 2001 share of more than 29% expands to more than 42% in 2030. In Germany and France the endogenous growth of biofuel share leads to biofuel consumption for transport in 2030 of 4.0% in Germany and 3.4% in France.

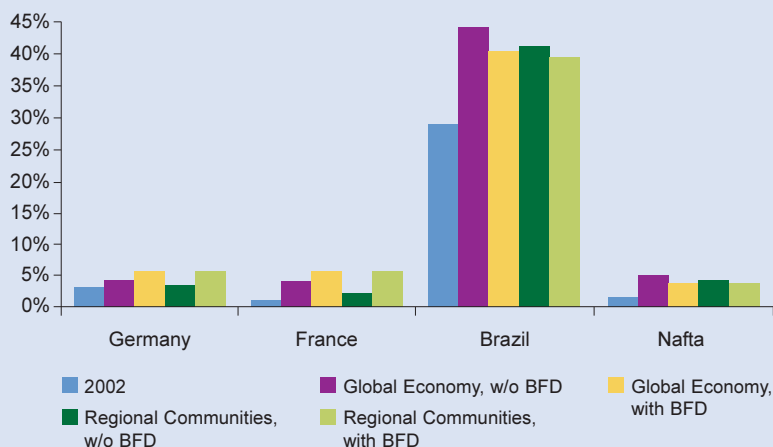


Figure 1. Development of share of biofuels in fuel consumption for transportation with or without mandatory blending (w/o) for selected regions, in %, 2001 and 2010 (NAFTA = North American Free Trade Agreement which members are Canada, Mexico and the United States of America).

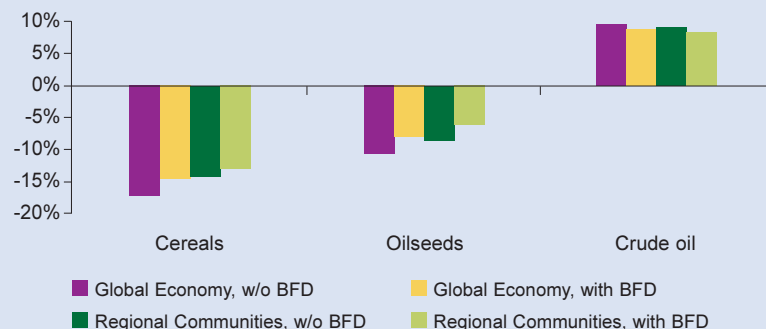


Figure 2. Changes in real world prices, in %, 2030 relative to 2001.

### Impact on food prices

With an enhanced biofuel consumption as a consequence of the EU BFD, prices of agricultural products tend to increase. This is especially the case for those products that are directly used as biofuel crops, but can also be used as food or feed. In the *Global Economy* scenario without a mandatory blending, real world prices for agricultural products tend to decline conform their long term trend, see Figure 2. This is caused by an inelastic demand for food in combination with a high level of productivity growth. In *Global Economy* with BFD, agricultural world prices rise relative to the reference scenario without BFD. However, the implementation of the EU BFD will reduce the increase in crude oil prices slightly. The shift to biofuels will have implications for the global carbon cycle. Since the greenhouse gas balance for 1<sup>st</sup> generation biofuels is not always positive, only a marginal gain in CO<sub>2</sub> emissions may be expected from this shift from fossil fuels to biofuels.

### Domestic production or imports?

To meet the ambitious future targets large quantities of 'biofuel crops' will be required in Europe. In the 'Global Economy' scenario with the minimum blending of 5.75%, the demand for biofuel crops used in the petrol sector will be 7.3 billion USD (in 2001 values). The results indicate that around 42% of these biofuel crops will be produced within Europe, and 58% will come from imports (see, Figure 3). If mandatory blending is not enforced the use of biofuel crops is much lower in all scenarios; only 2.5 billion USD in the 'Global Economy' scenario and only 1.7 billion USD in the 'Regional communities' scenario. The lower demand in 'Regional communities' is due to a lower increase in income compared to the 'Global Economy' scenario.

The degree of openness under both scenarios is also reflected in Figure 3. In the 'Global Economy' scenario without mandatory blending, the share of imported biofuel crops used for biofuel production is 54%, while under the higher

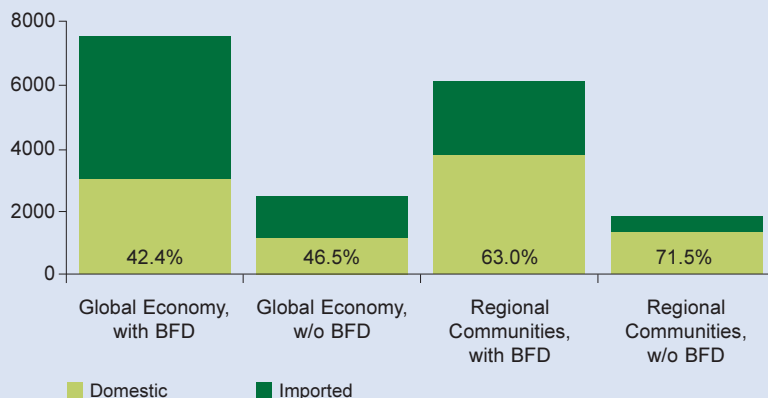


Figure 3. Biofuel Crops Used in the EU-27 (in Mill USD, 2001), 2030.

protection under the 'Regional community' scenario, imported biofuel crops contribute to the total biofuel production by only 29%. If the BFD is enforced, imports of biofuel crops strongly increase even under the more protected and self-sufficiency aimed 'Regional communities' scenario.

### EU will become a net-importer

The EU will become net-importer of agricultural commodities used for the production of biofuels as well in the biofuel scenarios as in the scenarios without Biofuel Directive (see Figure 4). South and Central America as well as high income countries will become net-exporters of agricultural products for biofuel production.

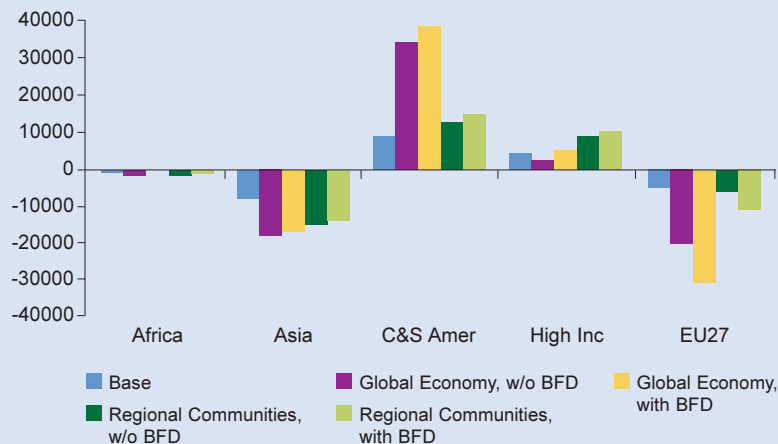


Figure 4. Net biofuel crop trade, in bill. US\$, Base situation and 2030 under different scenarios.



Table 1. Changes in agricultural production, in %, 2030 relative to 2001.

	Africa	Asia	C&S Amer	High Inc	EU27	EU12	EU15	World
<i>Biofuel Crops</i>								
Global Economy, without BFD	183.8	115.6	143.6	33.6	-18.8	6.9	-28.5	70.1
Global Economy, with BFD	187.8	116.5	150.9	34.7	-12.7	11.0	-21.5	73.3
Regional Communicaties, without BFD	126.2	95.9	64.5	33.3	-1.5	4.7	-3.8	49.5
Regional Communicaties, with BFD	128.3	96.2	67.5	34.0	11.1	9.2	11.9	52.5
<i>Oilseeds</i>								
Global Economy, without BFD	178.2	108.0	131.1	99.4	7.6	35.9	1.9	99.7
Global Economy, with BFD	181.1	108.6	135.4	102.0	26.0	47.9	21.5	103.6
Regional Communicaties, without BFD	119.6	88.2	69.7	75.8	15.3	8.2	16.7	71.9
Regional Communicaties, with BFD	124.3	88.9	76.9	78.6	40.1	22.4	43.7	77.0

### Worldwide expansion

In all world regions, mandatory blending leads to an increase in total agricultural output (see Table 1). Comparing the results of the 'Global economy' scenario with and without the BFD, the strongest relative increase in agricultural output takes place in the EU and South and Central America. The increase in the crop production for biofuels in the policy scenarios is mainly caused by a large expansion of the oilseed production (see Table 1). Oilseed production in the EU increases from 7.6% in the 'Global economy without BFD' scenario to 26% in the 'Global economy with BFD' scenario.

The BFD in the 'Regional communities' scenario also leads to an increased oilseed production. These developments lead to similar land use patterns. The EU BFD increases land use in all regions. In the EU-27, the decline in agricultural land use is smaller under the BFD scenarios. The extra amount of land in Brazil, needed for the export to Europe to meet its BFD target is estimated at approximately 10 million hectares (Figure 5).

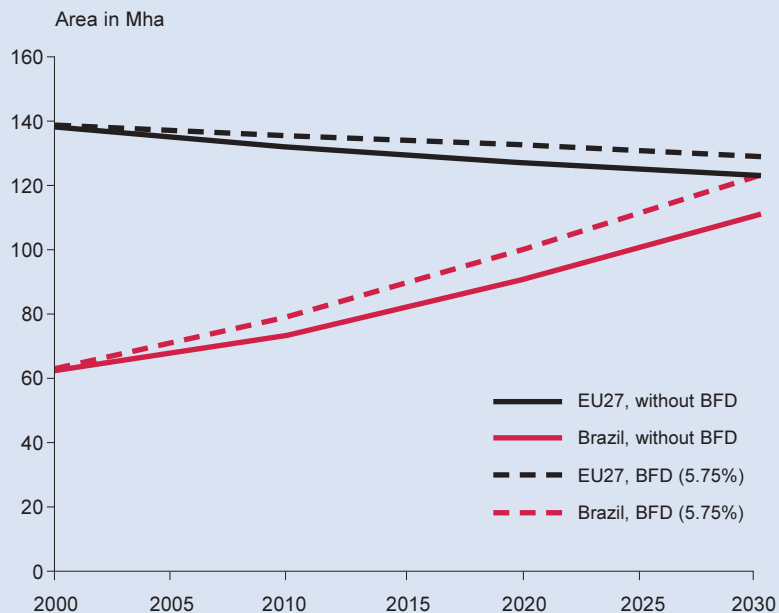


Figure 5. Development of arable crop area in Europe and Brazil for the period 2000-2030 with and without the Biofuel Directive (5.75% mandatory blending).

The expected expansion of agricultural land on a global scale, will impact regional biodiversity negatively as land use is an important driver for biodiversity. Especially in regions where an increase in agricultural land is expected, it is unlikely that the additional pressure on the land-use system will be compensated by technological improvements alone. For example, Latin America is already experiencing an increase in agricultural production without the increasing demand for biofuels (Table 1). Therefore, the increase in arable land will be

higher in those regions when an additional demand for biofuels occurs (Figure 5). On the short term this effect will dominate the outcome for terrestrial biodiversity as indicated in Figure 6.

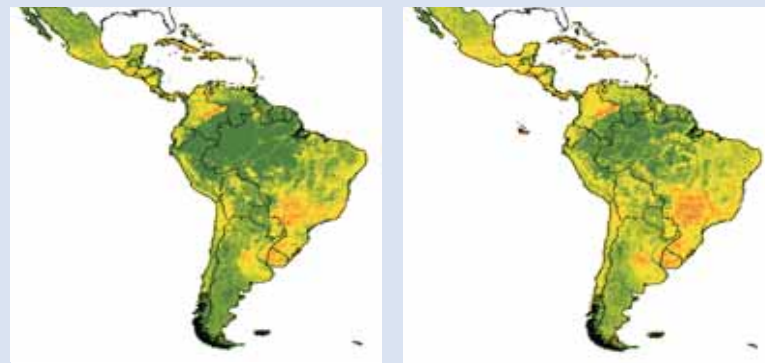


Figure 6. Biodiversity in Latin America in 2000 (left) and in the year 2050 (right panel) in steep increasing land-use scenarios<sup>9</sup>.

<sup>9</sup> Source: CBD, 2007. Cross-Roads of Life on Earth - Exploring means to meet the 2010 Biodiversity Target. Solution-oriented scenarios for Global Diversity Outlook 2. Secretariat of the Convention on Biological Diversity and Netherlands Environmental Assessment Agency, Montreal, 2007.



### Sustainability trade-offs

The potential impact of biofuels is the focus of a heated debate both scientifically and politically. Usually, participants in the debate differ in perspective: e.g. whether the use of biofuels is assessed from an agricultural background or from an ecological background matters substantially. Eururalis shows the impact of biofuels for multiple People, Planet and Profit indicators. From an agricultural profit perspective, biofuels will lead to a higher agricultural income for farmers. This may be interpreted as a positive outcome of biofuels. However, the increase in commodity prices can be considered a negative impact for consumers. Ecologically, the impact of biofuels on biodiversity, especially the biodiversity outside the EU, is clearly considered as a downside of biofuels. Besides the additional pressure on land and water resources will increase as well. On the other hand the improved energy self-sufficiency (or at least, the larger variety in energy exporters) may be considered a positive outcome of biofuels.

Results from Eururalis do not aim to give the ultimate judgement on biofuels, but they indicate that transparency in different people, planet, profit results is important for a scientifically sound discussion.

On the basis of Eururalis, it is clear the 1<sup>st</sup> generation of biofuels comes with many negative scores such as competition with food products and negative impact on biodiversity. These negative aspects will probably be far less apparent in 2<sup>nd</sup> generation biofuels. Therefore, a robust option for the EU might be to invest in R&D more for 2<sup>nd</sup> generation biofuels. However, the chance that 2<sup>nd</sup> generation biofuels are available commercially before 2020 is small. Therefore, mandatory targets for biofuels before 2020 should be set with caution and the environmental and social effects of biofuels should be carefully monitored.

# A positive future for the EU27 ....

In many European foresight studies, the future of Europe's rural areas is portrayed gloomily. Here, another side of the coin is shown as well. GDP is growing in all scenarios, real agricultural income is increasing in Central Europe and new opportunities arise for the recovery of biodiversity within Europe. Whether these outcomes are judged as positive mainly depends on which indicators are considered crucial. Therefore, Eururalis applied four different scenarios where totally different choices in market protection, self-sufficiency and environmental policies are implemented.

## Four scenarios - four futures

To assess whether the future of European rural areas can be regarded as positive it depends on your personal position or standpoint. To facilitate in making own judgments a spider diagram is presented in Figure 1. Here, the range of outcomes of several indicators can be investigated simultaneously. This representation allows to identify the advantages and disadvantages of each of the scenarios immediately. Depending on one's world view, each scenario can be regarded as a positive outcome.

In the *Global Economy* scenario the focus is on economic growth, aimed at by liberalizing the agricultural market and stimulating open markets. Consequently, this scenario results in a high general employment combined with a high GDP. The retreat of agriculture to the most favoured areas in Europe also offers new opportunities for high carbon sequestration and relatively high scores on the biodiversity index. Logically, the scenario also shows some downsides: real farm income is very low and agricultural employment is also lowest in this scenario.

The *Continental Market* scenario focuses on security and low government regulation. North America and the EU form one trade block with high border protection. Therefore, real farm income is highest in this scenario. Given the

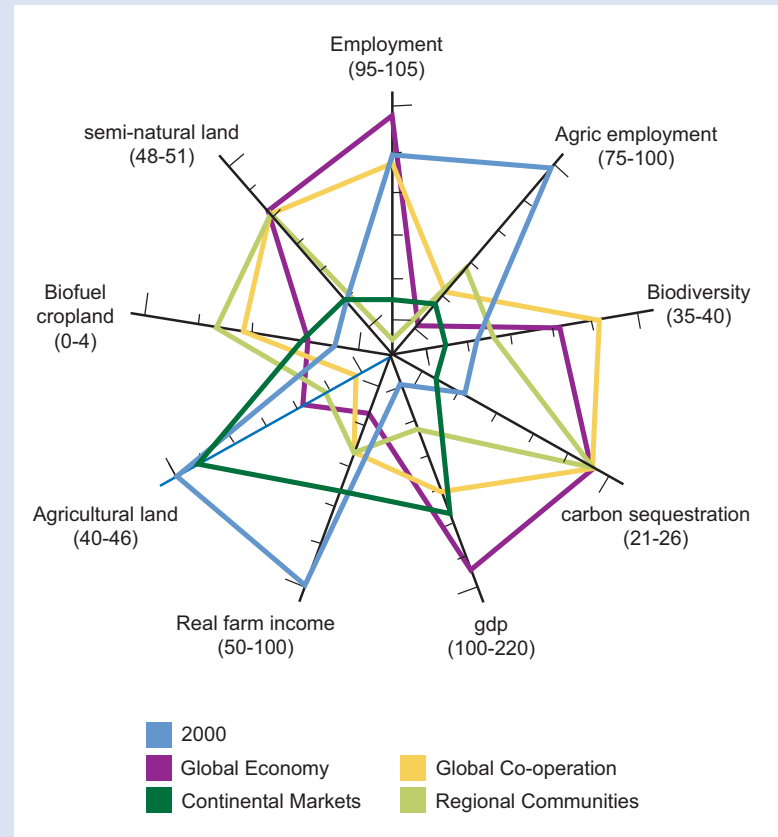


Figure 1. Spider diagram for the baseline scenarios for the EU27 in 2030.

focus on self-sufficiency, this indicator is considered crucial. GDP growth in Europe is also relatively high, although this is not the case for regions outside Europe. The downside is evidently on the environmental side: more land is needed for agricultural production and therefore, carbon sequestration and biodiversity show low results. Again, this is not considered crucial in this scenario.

The *Global Co-operation* scenario focuses on global solidarity. Therefore, this scenario does not result in the best results for Europe, but in medium results for GDP growth and employment growth. On the other hand, successful climate mitigation policies are assumed to take place as well; a success that will yield benefits on the longer term. Biodiversity in Europe profits from explicit biodiversity policies in Europe. Biofuels are stimulated in this scenario resulting in a high amount of biofuels crops.

The *Regional Communities* scenario is for many indicators the opposite of the Global Economy scenario. This scenario has the highest agricultural employment, which is the aim in this scenario since farmers are needed for many functions that are considered important (like nature protection, rural development and food production). Since environmental policies are only aimed at Europe, the planet indicators take an intermediate position. On the macro-economic side the price is paid by lower GDP growth and less total employment growth.

In general, it can be concluded that Europe yields positive results in those areas where the political focus is. This shows that political decisions can direct the European results to a certain extent. Moreover, the future of Europe's rural areas is not as grim as some studies indicate. European agriculture will remain important in a world where global food and feed demand is increasing substantially and new agricultural demands like biofuels emerge. Nevertheless,

the agricultural share in GDP will continue to decline, making Europe's economy less vulnerable to changes in this sector. And new opportunities for environmental recoveries arise slowly. In that sense we envisage a positive future for the EU27.



### But sectoral and regional differences remain large

Notwithstanding the positive developments that can be identified, future developments will implicate huge changes in the agricultural sector. Rural population continues to decline (see Figure 2; left panel) and employment growth in the agricultural sector will decline substantially in all scenarios (Figure 2; right panel). These developments are affecting the rural areas in Europe, possibly leading to much insecurity in those areas. Politicians need to cope with these instabilities and cannot pretend these developments are easy to adjust. This part of the story needs to be told as well, besides the positive opportunities from a more macro-perspective, as described above.

Moreover, large differences remain *between* regions *within* Europe. In general, rural regions in the EU12 are still lagging behind on socio-economic aspects; even in 2030. The structural change of agricultural production will lead to a labor

surplus that probably cannot be absorbed by the regional economies. This may enhance further migration from these regions to elsewhere (mainly urban areas), with new pressures in those regions possible.

In marginal regions of the EU15 land abandonment will occur on an extensive scale. As a consequence open farmland landscapes will disappear as well as accompanying specific habitats and valued landscapes. Although improvements are observed, a large number of regions still lag behind concerning environmental issues like erosion, biodiversity loss and large nutrients surpluses.

These rural challenges will remain in the future and may even increase in many rural areas. The European Union will have to develop innovative strategies to address these rural developments in order to preserve the quality of life of all its citizens. This challenge cannot be disregarded in the realm of positive stories that can be extracted from Eururalis.

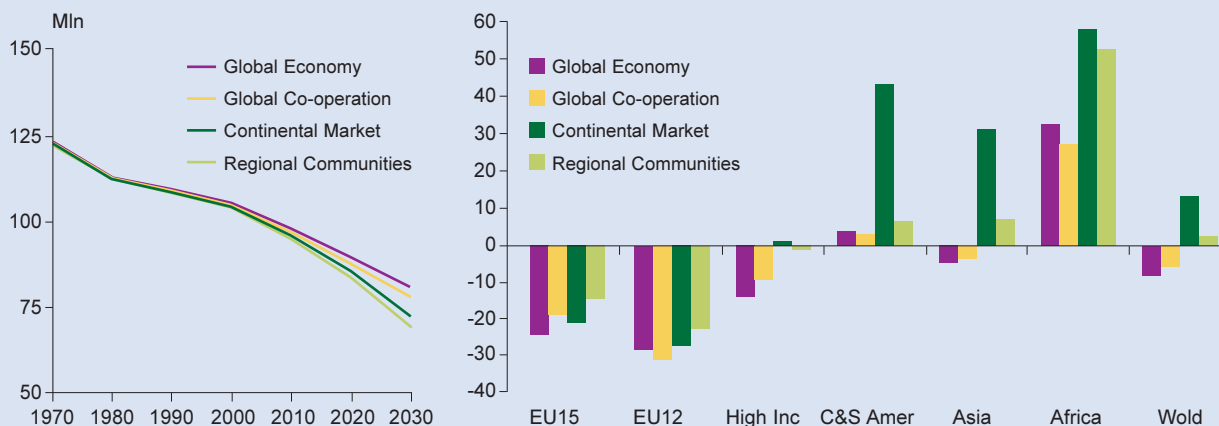


Figure 2. Rural population in the EU (left panel) from 1970 till 2030 and employment growth in all world regions (growth between 2001 and 2030; right panel). Results are given for the four Eururalis baselines.



# Regional heterogeneity in the EU

**European rural areas are far from uniform. One only has to think of the physical and climatic aspects that interact and produce landscapes range from mountains such as the Alps to the plains of Northern Germany and from the arctic of Finland to the Mediterranean climates of e.g. Greece. This variety combined with a diversity of historical, socio-economic, demographical and cultural developments, has resulted in a regional variety throughout Europe that is unique in the world. This diversity is very valuable to the Europe of today.**

## **Eururalis: over 660 regions**

In Eururalis, more than 660 different regions are distinguished. For each of these regions, data on landuse, people, planet and profit indicators are available for the situation in the year 2000 as well as for the next decades towards 2030. Using the Eururalis tool, one can explore what might happen to each of the regions over time and how it may then perform, compared to either other regions or a different scenario. Such an analysis will show that each region is unique, and has its own strengths and weaknesses, and its specific threats and opportunities for the future.

## **Regional typology**

To upscale the analysis and to be able to draw more general conclusions, a simple regional typology was developed to describe the characteristics of the regions. This enables us to explore the meaning of the results of the Eururalis project in more detail and at a regional level.

The typology was based on land-cover and on the economic significance of agriculture. Firstly, regions were divided based on the dominant land-use into:

1. Peri-Urban regions;
2. Nature regions;
3. Agriculture regions.

In the latter category – and most largest category – a refinement was made based on the contribution of agriculture to the economy of the region:

3a. Agricultural regions with *high* share in the regional economy,

3b. Agricultural regions with a medium or *low* share in the regional economy.

## **Characteristics and challenges**

The main characteristics and challenges of the four types of regions are:

### *Peri-urban regions*

- 11% of the land of these regions is currently used for urban dwellings.
- Urbanization is likely to progress, putting more pressure on the landscape.
- More than 50% of the land of Peri-Urban regions is currently used for intensive agriculture.
- The densely aggregated livestock production poses a high risk for the environment in many of these regions.
- These regions are characterized by low biodiversity, and have relatively few and small nature areas.
- Land-use changes mainly from agriculture towards urban.

### *Nature regions*

- Almost 90% of the land in these regions is nature or forest.
- Within these regions, land-use changes mainly from agriculture towards abandonment and nature. There is a concentration of hotspots of agricultural abandonment, with one third of farmland in these regions being threatened with abandonment. This means that open farmland landscapes are likely to disappear.
- Erosion remains a problem in these regions, especially in southern Europe.
- Biodiversity will change. Biodiversity related to extensive agriculture is likely to disappear due to land abandonment. This might on the short term lead to a loss of species. However, on the long term the new nature areas can develop into more biodiverse areas.





*Figure 1. Distribution of Peri-urban regions in Europe.*



*Figure 2. Distribution of Nature regions in Europe.*



Figure 3. Distribution of Agri-high regions in Europe.



Figure 4. Distribution of Agri-low regions in Europe.

*Agri-high regions (agriculture has a high share in the regions economy)*

- Agriculture uses over 50% of the land in these regions, of which a relatively high amount of agricultural land is used as permanent pasture.
- Towards the future a strong change of agricultural structure is expected.
- There will probably be a shortage of alternative employment for the agricultural labour surplus.
- This could lead to migration of the rural population elsewhere or growth of unemployment in the region.

*Agri-low regions (agriculture has a low share in the regions economy)*

- Agriculture uses over 50% of the land.
- Agriculture is of limited economic importance (< 2% GDP).
- Although off-farm employment continues to decrease, the absolute number of people affected is small.
- The regional economy is already mainly urban driven e.g. industries and services.
- Bio-energy crops are expected to especially evolve in these regions.



# Dilemmas and policy challenges

**The Eururalis scenario study shows the future of rural areas in the EU is many sided. There are different plausible paths and scenarios of development, the spatial variety within the Union is huge and many political challenges arise when considering the future, ranging from biodiversity to agricultural income and from land-use change to self-sufficiency. Policy measures can differ in impact between regions and Member States, and in some cases they may not have any impact at all. Furthermore, policy measures always seem to have trade offs. These trade-offs can occur between different topics where different political objectives exist, or between regions both inside and outside Europe.**

## Common interests

The Member States of the EU are connected in many different ways. The Member States and their regions share common interests that go beyond the scope of individual countries. These include the following issues:

- Physical connections, e.g. rivers, coastal waters and air quality;
- Economical connections, e.g. trade flows and labour migration;
- Social connections, e.g. through migration flows and the exchange of cultural ideas;
- A common outer world with issues that impacts every EU citizen such as climate change or security;
- A need for a common approach regarding fulfilling basic requirements such as the supply of food and energy;
- Advantages of cooperation in terms of scale can offer benefits in R&D and job opportunities.

Through all these issues Member States are connected, facing the same dilemmas and policy challenges. Integration of policy strategies is necessary to deal with these challenges and opportunities in an effective way.

## Future challenges

It is easy to ask for an integrated rural policy strategy for Europe, but its realisation is much harder due to Europe's heterogeneity and its dynamic setting. Within Europe, there is great variety between different Member States and regions in societal values and preferences as well as physical circumstances. Additionally, global trends like world trade, technological developments and climate change alter the playing field of rural areas continuously and cannot be diverted easily.

It is a challenge to deal with this complex system via general European policy measures. A regional typology could be very helpful in identifying the most important regional differences. If this regional typology is able to discriminate between several types of regions on the basis of their strengths and weaknesses, and their future opportunities and threats, authorities might be able to anticipate more easily upon global trends and to develop a tailor-made set of policy instruments.

The Eururalis results indicate that future problems will become more complex to solve and will therefore ask for coherent policy strategies. In Eururalis four scenarios with four different global orientations have been elaborated. By comparing the results of these four scenarios a good indication is given of persistent dilemmas. Moreover, the four Eururalis scenarios can be altered using different policy buttons, showing the relative impact of adjustments in CAP policies, biofuel directives and less favoured areas. By assessing the impacts of all these scenarios and its policy variants for people, planet, profit indicators the persistent European dilemmas and possible robust solutions can be identified. The following dilemmas can be derived as a result of Eururalis:

- The importance of primary agriculture in the economy will decrease in all scenarios. For some regions in Europe it will be a huge challenge to absorb the redundant labour in the rest of its economy, since general employment

growth is expected to be low. Especially in those regions where the importance of agriculture is declining substantially and general employment is not expected to improve there is a need to invest in job creation or else these regions will face increasing unemployment or migration of their citizens to other regions.

- Climate change may change agriculture and rural areas significantly. What political strategies are needed to adapt or to mitigate these changes?
- Abandonment and marginalization is the dominant land-use change in the next decades in the EU. How should this process be dealt with, especially in the 'hotspot' regions?
- Agriculture is not only a production entity, but is also a crucial contributor to landscape values, a conservator of biodiversity, an actor in environmental challenges and a contributor to socio-cultural values. How can the multi-functional role of EU's agriculture be maintained and strengthened?
- How can the competitiveness of EU agriculture be enhanced in the global context?
- Liberalization as well as regulation of agricultural production have positive and negative impacts. How can we anticipate on these impacts, exploring the middle ground to tackle negative aspects of both sides?
- The production of biofuels will offer opportunities and threats. What kind of trade-offs are we willing to accept? How to pass the transition phase from 1<sup>st</sup> to 2<sup>nd</sup> generation biofuels?

### Role of policy

Developments in the world are of great importance for the EU. The future of the EU cannot be considered in isolation. Global trends are important and ask for a constant monitoring in order to assess the opportunities and threats it brings for the EU. The other way around, European policies cannot be assessed sufficiently if the external impacts of Europe on the rest of the world are disregarded. Strategic EU policy measures can certainly influence the future of its rural areas,

but its impact is often limited by global trends. The impact of policy measures strongly differs between scenarios. In general, there is less room for EU policies in the globalization scenarios. Additionally, implemented policy measures not only have impact on specific targets, but always have trade offs. Trade offs over time, trade offs in the spatial dimension and trade offs to other political subjects. Considering the above, on four scale levels policy makers may enhance sustainable development of rural Europe. On the global level (e.g. climate change and trade liberalization), on the European level (e.g. the future of sustainable agriculture and the impact of CAP reform), on the national level (e.g. the function of agriculture for land-management), and on the regional level (e.g. tailor made regional strategies for vital rural areas).

### Policy science interaction

The concept of sustainable development is characterized by numerous ambiguities. A sustainable development strategy for Europe asks for a coherent approach, especially on the following three aspects:

- On the combination of people, planet and profit. Sustainable development and quality of life require a certain balance between these three separate domains.
- On maintaining and strengthening the quality of life not only on the short term but also on a longer term for future generations.
- On the relationships between 'here' and 'elsewhere'. Are we able to improve our quality of life in Europe, without affecting other parts of the world too much.

To determine the right balance between these aspects and to formulate European policies to anticipate on the future is an extremely difficult task which lead to vivid discussions amongst policy makers, Non Governmental Organisations and the public. The scenarios and simulations of Eururalis can contribute to such discussions, by shedding some light on the certainties and uncertainties of the European future.

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## Support groups

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## External data

Important data sources:

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- EEA, Denmark
- FAOSTAT, Italy
- MNP-RIVM/TNS-NIPO

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