Alternative futures of rural areas in the EU

Kristina M. Jansson
Ida J. Terluin

Report 2009-057
August 2009
Project code 20807
LEI Wageningen UR, The Hague

LEI Wageningen UR conducts research in the following areas:

- International policy
- Development issues
- Consumers and supply chains
- Sectors and enterprises
- Environment, nature and landscape
- Rural economy and use of space

This report is part of the research area International policy.

This research has been carried out within Policy-Supporting Research BO-01-009 within the framework of programmes for the Dutch Ministry of Agriculture, Nature and Food Quality.

Photo: Shutterstock

Alternative futures of rural areas in the EU

Jansson, K.M. and I.J. Terluin

Report 2009-057
ISBN/EAN: 978-90-8615-353-4
Price € 22,50 (including 6% VAT)
109 p., fig., tab., app.

In this study alternative futures of rural areas in the EU are explored. For this purpose, a comparative analysis of seven scenario studies of rural areas in the EU was conducted. Often, these scenario studies constructed a baseline scenario - derived from an extrapolation of past trends and policies - and a number of alternative scenarios with different degrees of policy intervention. The time horizon in the scenario studies varies from 2020 to 2035. By focusing on a number of main drivers and responses, we were able to distinguish six distinct alternative futures of rural areas in the EU.

In deze studie wordt onderzoek gedaan naar alternatieve toekomstbeelden voor landelijke gebieden in de EU. Voor dit doel is er een vergelijkende analyse uitgevoerd van zeven scenariostudies met betrekking tot landelijke gebieden in de EU. Vaak werkten deze studies met een referentiescenario (op basis van een extrapolatie van trends en beleid) en een aantal alternatieve scenario's met verschillende niveaus van beleidsinterventie. De tijdshorizon in de scenariostudies varieert van 2020 tot 2035. Aan de hand van een aantal belangrijk drijvende krachten en reacties, hebben we zes verschillende toekomstbeelden voor landelijke gebieden in de EU kunnen onderscheiden.

Orders

+31 70 3358330
publicatie.lei@wur.nl

LEI is ISO 9000 certified.

Contents

Preface

Rural areas in the EU are involved in a process of continuous change, which affects the composition of both economic activities and residents, land use, landscape, the environment and biodiversity. Main changes in rural areas since the second world war refer to modernisation of agriculture, a gradual decrease in agricultural employment and the inflow of new residents, either economic active actors or pensioners. The modernisation of agriculture was usually accompanied by intensification of the land use, degradation of landscape values and deterioration of biodiversity. In marginal rural areas, land abandonment occurred to different degrees. As a result of these changes, today's rural Europe looks totally different from rural Europe in the late 1940s.

It could be expected that the face of rural Europe will change further in the coming decades, driven by forces such as macro-economic growth, demographic changes, climate changes and energy transitions. During the last few years, a number of scenario studies (i.e. ESPON, Eururalis, SCENAR 2020, SEAMLESS, SENSOR, PRELUDE and 'Agriculture in the overall economy') have tried to outline alternative futures of rural Europe. In this study a comparative analysis of these scenario studies is conducted, resulting in six distinct alternative futures of rural areas in the EU. Insights into alternative rural futures might be helpful in identifying challenges for rural development policy.

This study has been financed by the Dutch Ministry of Agriculture, Nature and Food Quality (BO-01-009-902). We greatly acknowledge the stimulating cooperation and useful comments of Hayo Haanstra, who supervised this study on behalf of the Ministry.

Prof Dr R.B.M. Huirne
Director General LEI Wageningen UR

Summary

The aim of this study is to explore alternative futures of rural areas in the EU. For this purpose, we made a comparative analysis of seven scenario studies of rural areas in the EU: ESPON, Eururalis, SCENAR 2020, SEAMLESS, SENSOR, PRELUDE and 'Agriculture in the overall economy'. A scenario is neither a forecast nor a prediction, but should be understood as a coherent, internally consistent and plausible description of a possible future state of the world. Usually, a scenario starts from assumptions on the development of a number of external drivers, like population growth, economic growth and climate change. These external drivers provoke local responses in rural areas, for example, by entrepreneurs, consumers and policy makers. The specific interplay of external forces and local responses colours the rural future. The range of possible rural futures put forward by the various scenario studies might serve strategic thinking about some of the key challenges rural Europe may face in the field of agriculture, rural development, land use, and the environment.

The methodological discussion of the design of scenarios in chapter 2 provides items for a scheme for assessing the scenario studies and a scheme for describing the images of the rural futures in the scenario studies. Both schemes are applied in reviewing the scenario studies in chapter 3 and in the comparative analysis of the scenario studies in chapter 4.

Time horizon varies from 2020 to 2035

On the whole, all scenario studies aim to explore future trends and driving forces, which shape rural areas in Europe within a dynamic global context, and to anticipate how different policy systems would themselves impact on rural areas. The precise meaning of 'rural areas' differs among the scenario studies, varying from a wide territorial approach to a more narrow sectoral approach. The time horizon in the scenario studies varies from 2020 to 2035.

Baseline scenario with alternative policy scenarios are often used

The construction of a baseline scenario - derived from an extrapolation of past trends and policies - combined with a number of alternative scenarios with different degrees of policy intervention, appears to be the most common approach of the scenario studies. Usually, these alternatives refer to a competitiveness scenario with a low degree of policy regulation and a cohesion scenario

with a high degree of policy regulation. The construction of scenarios in PRELUDE and Eururalis, however, deviates from the other scenario studies. PRELUDE does not use a baseline scenario and alternative policy scenarios, but assumes a number of disruptive events in the near future. These disruptive events are amongst others a strong decrease in societal solidarity, severe flooding, an international energy crisis, heavy air pollution in urban areas, a food security crisis and environmental disasters. These events provoke a series of 'new' population and policy responses, resulting in images of the rural future in Europe that highly deviate from the present situation in rural Europe. Eururalis does not use a baseline scenario, but employs a set of four contrasting futures, derived from opposite dimensions of policy intervention and global market integration.

The nature of most scenarios can be denoted as 'explorative': the scenarios address the question 'what can happen?' All scenario studies, apart from PRELUDE, apply an inclusive approach: their scenarios describe a set of alternative futures of rural Europe and it is hoped that the 'real' future is included in this set. PRELUDE, on the other hand, uses an imaginative approach. Its scenarios describe possible futures, which do not need to be plausible.

Drivers of the scenarios

Drivers in the scenario studies are often divided into exogenous drivers and policy-related drivers. In all scenario studies, global macro-economic growth and demographic changes are included in the exogenous drivers. Demographic changes are reflected in various indicators, like global population growth, population growth in the EU, population ageing, migration, labour market participation and settlement density. Policy drivers, either related to the CAP, biofuel, trade, EU enlargement, R&D, transport and the environment, are included in all scenario studies.

Six distinct images of rural areas in Europe

Depending on the assumptions made in the scenarios, smaller or larger changes in rural areas in the EU are anticipated as compared to the current situation. On the whole, by focusing on population, globalisation, climate change, policies, agriculture, agricultural land use, landscape, nature and biodiversity and territorial disparities in rural Europe, we were able to derive six distinct alternative images of rural areas in Europe from the scenario studies.

These could successively be labelled as:

1. rural future in the EU: baseline;
2. rural future in the EU: competitiveness;
3. rural future in the EU: cohesion;
4. rural future in the EU: clustered networks;
5. rural future in the EU: lettuce surprise u;
6. rural future in the EU: big crisis.

The images of a competitive and cohesion rural future reflect a dichotomy in regional development policies of efficiency versus equity. However, rural images such as clustered networks, lettuce surprise u and big crisis reveal that main challenges for Europe's rural future are not necessarily contained within this dichotomy of competitiveness versus cohesion. On the contrary, these challenges require new policy approaches, which might depart in many respects from the policies applied up to now. Moreover, the role of public policies in shaping the rural future should not be exaggerated. Rural Europe rather emerges from the interplay of global market forces and local responses by entrepreneurs, consumers and policy makers.

Samenvatting

Het doel van deze studie is om alternatieve toekomstbeelden voor landelijke gebieden in de EU te onderzoeken. Hiertoe hebben we een vergelijkende analyse uitgevoerd van zeven scenariostudies met betrekking tot landelijke gebieden in de EU: ESPON, Eururalis, SCENAR 2020, SEAMLESS, SENSOR, PRELUDE en 'Agriculture in the overall economy'. Een scenario is geen verwachting of voorspelling, maar moet worden gezien als een coherente, consistente en plausibele omschrijving van een mogelijke toekomstige toestand van de wereld. Meestal is een scenario gebaseerd op aannames over de manier waarop een aantal externe stimuli, zoals bevolkingsgroei, economische groei en klimaatverandering, zich ontwikkelen. Deze externe stimuli zorgen voor lokale reacties vanuit landelijke gebieden, bijvoorbeeld van ondernemers, consumenten en beleidsmakers. De specifieke wisselwerking tussen externe invloeden en lokale reacties is van invloed op de toekomst van het platteland. De verschillende toekomstbeelden voor het platteland die uit de verschillende scenariostudies kunnen worden afgeleid, kunnen een strategische manier van denken stimuleren over een aantal van de belangrijkste uitdagingen waarmee de landelijke gebieden in Europa te maken krijgen op het gebied van landbouw, plattelandsontwikkeling, landgebruik en het milieu.

De methodologische discussie in hoofdstuk 2 over het ontwerp van de scenario's dient als basis voor het beoordelen van de scenariostudies en voor het omschrijven van de toekomstbeelden voor het platteland. In hoofdstuk 3 worden de afzonderlijke scenariostudies beoordeeld en in hoofdstuk 4 volgt een vergelijkende analyse van de scenariostudies.

Tijdshorizon varieert van 2020 tot 2035

Over het geheel genomen hebben alle scenariostudies tot doel om de toekomstige trends en drijvende krachten te onderzoeken die van invloed zijn op de landelijke gebieden in Europa in een dynamische, globale context en om te anticiperen op de manier waarop de verschillende beleidssystemen zelf van invloed zijn op landelijke gebieden. De definitie van 'landelijke gebieden' is niet bij alle scenariostudies hetzelfde. Dit loopt uiteen van een brede territoriale benadering tot een nauwere sectorale benadering. De tijdshorizon in de scenariostudies varieert van 2020 tot 2035.

Baseline-scenario met alternatieve beleidsscenario's wordt vaak gebruikt
Het opstellen van een referentie (op basis van een extrapolatie van trends en beleid) en een aantal alternatieve scenario's met verschillende niveaus van beleidsinterventie blijkt de gebruikelijkste benadering van scenariostudies te zijn. Meestal zijn de alternatieve scenario's een *competitiveness*-scenario met weinig beleidsregulering en een *cohesion*-scenario met veel beleidsregulering. De opbouw van de scenario's bij PRELUDE en Eururalis wijkt echter af van de andere scenariostudies. Bij PRELUDE wordt er geen gebruik gemaakt van een referentiescenario en alternatieve beleidsscenario's, maar wordt er uitgegaan van een aantal verstorend en trendonderbrekende gebeurtenissen in de nabije toekomst. Voorbeelden van verstorende gebeurtenissen zijn een sterke afname in maatschappelijke solidariteit, zware overstromingen, een internationale energiecrisis, ernstige luchtvervuiling in stedelijke gebieden, een voedselveiligheidscrisis en milieurampen. Deze gebeurtenissen leiden tot een aantal 'nieuwe' bevolkings- en beleidsreacties, waardoor het toekomstbeeld voor het Europese platteland in grote mate afwijkt van de huidige situatie op het Europese platteland. Eururalis gaat niet uit van een referentiescenario, maar van vier contrasterende scenario's, die zijn afgeleid van verschillende niveaus van beleidsinterventie en globale marktintegratie.

De meeste scenario's zijn niet 'verkennend' van aard; de scenario's spelen in op de vraag 'wat kan er gebeuren?' Alle scenariostudies, behalve PRELUDE, maken gebruik van een allesomvattende benadering: de scenario's omschrijven een aantal alternatieve toekomstscenario's van het Europese platteland en hopelijk is één van deze scenario's de 'werkelijke' toekomst. PRELUDE maakt echter gebruik van een fictieve benadering. Hierbij worden mogelijke toekomstscenario's omschreven die niet per definitie plausibel hoeven te zijn.

Stimuli van de scenario's
De drijvende krachten in de scenariostudies worden vaak onderverdeeld in exogene en beleidsgerelateerde stimuli. Bij alle scenariostudies vallen de wereldwijde macro-economische groei en de demografische veranderingen onder de exogene stimuli. Demografische veranderingen komen tot uiting in verschillende indicatoren, zoals de groei van de wereldbevolking, de bevolkingsgroei in de EU, vergrijzing, migratie, arbeidsparticipatie en bevolkingsdichtheid. In alle scenariostudies zijn er beleidsstimuli opgenomen die te maken hebben met het GLB, biobrandstof, handel, het uitbreiden van de EU, R&D, transport en het milieu.

Zes verschillende scenario's voor landelijke gebieden in Europa
Afhankelijk van de aannames in de scenario's wordt er geanticipeerd op kleinere of grotere veranderingen in de landelijke gebieden in de EU ten opzichte van de huidige situatie. Over het geheel gezien kunnen er zes verschillende alternatieve toekomstbeelden voor landelijke gebieden in Europa worden onderscheiden in de scenariostudies als we kijken naar de bevolking, de globalisering, de klimaatverandering, het beleid, de landbouw, het gebruik van landbouwgrond, het landschap, de natuur, de biodiversiteit en de territoriale ongelijkheden op het Europese platteland. Deze kunnen als volgt worden aangeduid:

1. toekomst van het platteland in de EU: *baseline;*
2. toekomst van het platteland in de EU: *competitiveness;*
3. toekomst van het platteland in de EU: *cohesion;*
4. toekomst van het platteland in de EU: *clustered networks;*
5. toekomst van het platteland in de EU: *lettuce surprise u;*
6. toekomst van het platteland in de EU: *big crisis.*

De toekomstbeelden voor het EU-platteland die op basis van het *competitiveness*-scenario en het *cohesion*-scenario worden geschetst, reflecteren een tweedeling in het regionale ontwikkelingsbeleid met betrekking tot efficiëntie ten opzichte van gelijkheid. Toekomstbeelden zoals *clustered networks*, *lettuce surprise u* en *big crisis* laten echter zien dat de belangrijkste uitdagingen voor de toekomst van het Europese platteland niet per se in de tweedeling van concurrentie ten opzichte van cohesie liggen. Integendeel, voor deze uitdagingen zijn nieuwe beleidsbenaderingen nodig die mogelijk in veel opzichten afwijken van het beleid dat tot nu toe is toegepast. Bovendien moet de invloed van het overheidsbeleid op de toekomst van het platteland niet worden overdreven. Het platteland van Europa komt eerder voort uit de wisselwerking van wereldwijde marktkrachten en lokale reacties van ondernemers, consumenten en beleidsmakers.

1 Introduction

What does rural Europe look like in 2030? Is agriculture still the main land user? Does large-scale land abandonment occur? Does climate change affect the suitability of rural areas for agricultural and residential purposes? Have many urbanites left the cities and settled in rural areas? Has the quality of landscape and environment in rural areas deteriorated or has it been improved by nature protection measures? Are rural regions an integrated part of the European economic centre, or have they become marginalised? The answers to these and other questions could help to create an image of the future of rural Europe. During the last couple of years, a number of scenario studies have tried to address these questions, such as ESPON (ESPON Project 3.2, 2006), Eururalis (Rienks et al., 2008), SCENAR2020 (Nowicki et al., 2006), SENSOR (Kuhlman et al., 2006), SEAMLESS (Pérez et al., 2007), PRELUDE (EAA, 2007) and 'Agriculture in the overall economy' (Banse and Grethe, 2007).

The alternative futures of rural areas in the EU in the abovementioned studies were designed as scenarios. By definition, a scenario is neither a forecast nor a prediction, but should be understood as a coherent, internally consistent and plausible description of a possible future state of the world (EAA, 2007). Usually, a scenario starts from assumptions on the development of a number of external drivers, such as population growth, economic growth and climate change. These external drivers provoke local responses in rural areas, for example, by entrepreneurs, consumers and policy makers. The specific interplay of external forces and local responses colours the rural future. The range of possible rural futures put forward by the various scenario studies might serve strategic thinking about some of the key challenges, rural Europe may face in the field of agriculture, rural development, land use, and the environment (EAA, 2007).

Objective

The aim of this study is to explore alternative futures of rural areas in the EU. For this purpose, a comparative analysis of different scenario studies of rural areas in the EU is carried out. From this analysis a set of alternative futures of rural areas in the EU is identified. These cover a wide range of different possible futures. The time horizon in this study is not fixed, but depends on the time ho-

rizon used in the reviewed studies. Often, the time horizon in these studies refers to 2020 or 2030.

Plan of this study

The plan of this study is as follows. In chapter 2, we discuss some methodological issues on the design of scenarios and we introduce a scheme for assessing the properties of the various scenarios used in the scenario studies and a scheme for a systematic description of the rural futures according the scenarios. In chapter 3, we explore the images of the rural futures in the scenario studies by using the two assessment schemes. In chapter 4, we make a comparative analysis of the scenario studies considered in this study. Final comments are presented in the last chapter.

2 Methodological approach

2.1 Introduction

Different methods can be used for describing the future. According to the European Foresight Monitoring Network (EFMN), literature reviews, scenarios, brainstorming and expert panels are the most popular methods; often, a combination of different methods is used (EFMN, 2006). In this study, we analyse scenario studies on the future of rural areas in Europe. In this chapter, first discuss some methodological issues on the design of scenarios, such as goal, content and nature. Second, we design a scheme for assessing the properties of the various scenarios used in the scenario studies and a scheme for a systematic description of the rural futures according to the scenarios.

2.2 Types of scenarios

Some systematisation of different scenario types has been attempted and one typology is presented in Van Notten et al. (2003). This typology can be used as a checklist when analysing (or designing) scenarios to make sure that all aspects have been considered. The basic reasoning starts in three overarching themes: project goal, process design and scenario content. From this a number of scenarios can be derived (Tables 2.1-2.3).

Project goal characteristics
In Table 2.1 scenario characteristics related to the project goals are shown. The arrows show an axis and can be understood as implying 'versus'. Thus, the 'normative' scale goes from normative (a target is set) to descriptive where the scenario is purely exploratory. The vantage point shows the point from which the scenario is developed, the extremes on this axis are forecasting and backcasting. The subject of the scenario shows the focus of the study - this of course does not have an axis or a 'versus' - and the authors mention three subjects. A scenario can be developed for long- or short-term and can contain different spatial levels.

Table 2.1	Project goal characteristics of a scenario		
Project goal characteristics	**Scenario implication**		
Inclusion of norms?	normative	⟷	descriptive
Vantage point	forecasting	⟷	backcasting
Subject of scenario study	issue-based	area-based	institution-based
Time scale	long-term	⟷	short-term
Spatial scale	global scale	⟷	local scale
Source: Van Notten et al. (2003).			

Process design characteristics

In Table 2.2 characteristics of the process design of a scenario are presented. The data can be qualitative or quantitative or a combination of these. The collection of the data can be a participatory process of workshops, interviews, et cetera or a desk research. Resources can be limited or extensive and the institutional conditions can be open (no interference) or constrained (big interference).

Table 2.2	Process design characteristics of a scenario		
Process charactersistic	**Scenario implication**		
Nature of data	qualitative	⟷	quantitative
Method of data collection	participatory	⟷	desk research
Nature of resources	extensive resources	⟷	limited resources
Nature of institutional conditions	open conditions	⟷	constrained conditions
Source: Van Notten et al. (2003).			

Scenario content characteristics

Table 2.3 shows the characteristics of the scenario content, derived from Van Notten et al. (2003) and the Intergovernmental Panel for Climate Change (IPCC) (2005). The IPCC prepared scenarios to describe the effects of climate change. The temporal nature reveals if the presented scenarios show the whole chain leading up to the point in the future that is analysed in the study, or if just the end point is shown as a snapshot. The level of heterogeneity of the variables can vary: heterogeneous variables cover a wide range of fields (economy, demography, culture, et cetera) whereas homogenous variables include several variables within one field (economy: competitiveness, trade, income, et cetera). The dynamics in the scenario mirrors the changes that can be built into the scenario, where a discontinuous scenario allows for breaks that a trend scenario

cannot do. The origin of the variables reflects a situation where only external factors are used as input in the scenario versus a self-contained scenario with a dynamic interaction of external and internal factors. The level of deviation indicates how far apart the scenarios in a study are. The nature of the scenarios may refer to a reference scenario plus a number of alternatives or a set of contrasting futures derived from opposite dimensions of main future directions. The level of integration shows to what extent the components of the scenarios are put together to form a whole. Finally, the level of likelihood refers to the exclusion or inclusion of a degree of likelihood in the scenario.

Table 2.3 Scenario content characteristics

Scenario content characteristic	**Scenario implication**		
Temporal nature	chain of development	⟷	snapshot at the end
Nature of the variables	heterogeneous variables	⟷	homogenous variables
Origin of the variables	external factors only	⟷	Self contained set of external and internal factors
The nature of the dynamics	peripheral scenario (discontinuous)	⟷	trend scenario
The nature of the scenarios	reference plus variants	⟷	contrasting futures
Level of deviation	alternative scenarios	⟷	conventional scenarios
Level of integration	high integration of components	⟷	low integration of components
Level of quantification/ qualification	skeleton	⟷	storylines
Level of likelihood	deterministic	⟷	probabilistic

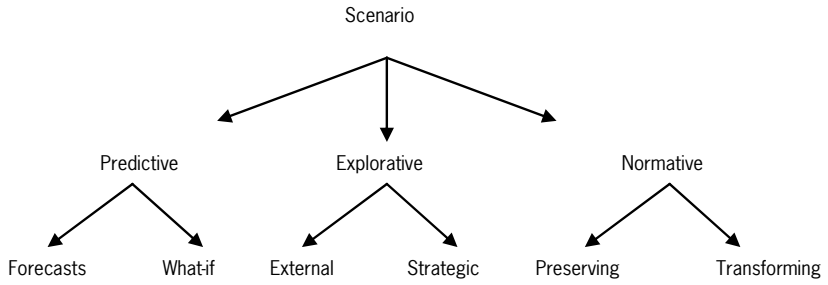
Source: Van Notten et al. (2003); IPCC (2005); adaptation LEI.

Predictive, explorative and normative scenarios

The above typology has its main merit in the development and design of scenarios, but also shows the content of scenario studies which can be useful in analysing scenario studies. A more general overview of scenario types could, however, be useful for the purpose of this report. A useful typology can be found in Börjeson et al. (2006), who distinguish three categories of scenarios and six types (Figure 2.1). The three categories predictive, explorative and normative are based on the underlining questions: 'What will happen?', 'What can happen?', and 'How can a specific target be reached?' Apart from these ques-

tions it is important to be aware of what factors are external and what factors are internal, as well as how these are connected within the system that is being studied.

Figure 2.1 **Scenario typology according to Börjeson et al. (2006)**



According to Börjeson et al. (2006) two types of scenarios can be sorted under each category. Consequently, the predictive scenarios can be forecasts, usually including a reference scenario plus a high and low, or what-if scenarios in which a certain decision is taken at 'present' and the future effect of this decision is investigated in the scenario. The aim of these is to predict what will happen and they are normally drawn up to enable better planning and adaptation to a certain situation. Explorative scenarios can be external - answering the question what can happen to external factors, or strategic - answering the question what can happen if we act in a certain way. Usually these are groups of scenarios where possible futures are described - so possible developments are covered. They differ from the what-if scenarios in that they have often a longer time-horizon and changes can therefore be more profound. The external scenario provides a basis for long-term strategy developments since it gives possible futures of external factors. The strategic scenarios take the policy options for the scenario builder or user into account and the aim is to describe a range of possible consequences of strategic decisions. Internal factors are the focus of the latter scenario. The last category, the normative, distinguishes how the system structure is treated: preserving scenarios respond to the question 'how can we reach the target by adjustments to the current situation?' Transforming scenarios respond to 'how can the target be reached when the current structure blocks change?' In both cases the starting point is a target, in the first case the

target is usually sought for through an optimisation model, and in the latter case backcasting is the most common technique to find out how to reach the target.

The Börjeson approach can be said to have the fundamental research questions in focus; the selection of a type of scenario is guided by the objective of the study.

Approaches to the design of scenarios

A different division or typology of scenarios is described in Kuhlman et al. (2006). This typology consists of four wide groups of scenarios mainly based on how these are designed. The typology distinguishes the following four approaches:

1. *extrapolating approach*, in which the current trends are extrapolated;
2. *expert judgment*, in which experts describe possible futures;
3. *inclusive approach*, in which a group of possible and plausible future worlds is described and the 'real' future hopefully is somewhere in between;
4. *imaginative approach*, where a group of possible futures is described and they need not to be plausible.

The Kuhlman typology does not show as much detail as the typologies described above. As a first scan in analysing the used methods in the scenarios it is useful and the four groups can be further sorted under the descriptions of the other typologies.

Use of scenarios

Scenarios can also be grouped according to the kind of process that they are meant to support (Westhoek et al., 2006):

1. policy optimisation;
2. vision building;
3. strategic orientation.

Policy optimisation scenarios try to find the best way to reach a particular objective. Usually, such scenario studies are structured as a baseline scenario that is contrasted with some policy variants. Vision building scenarios explore futures we want to strive at or to avoid. Often, a reference scenario and some alternative scenarios ('good' and 'bad') are used, sometimes combined with a backcasting scenario. Finally, strategic orientation scenarios focus on what alternative worlds we need to prepare ourselves. Usually, strategic orientation

scenario studies employ contrasting futures, combining storylines and data. This approach is similar to the Börjeson approach presented above.

2.3 Methodology for reviewing scenario studies

In the previous section four different typologies for describing scenarios were presented:

1. The Van Notten and the IPCC approach, which starts with the overarching themes of the scenarios;
2. The Börjeson approach, which starts with three basic questions;
3. The Kuhlman approach,, which starts with the method of designing the scenario;
4. The Westhoek approach, which starts with the use of the scenario.

By using these typologies, we designed an assessment scheme for structuring our analysis of scenario studies (Table 2.4). A next step in the analysis of the scenario studies is to describe the images of the rural futures in the EU, which emerge from the scenarios. A framework for describing these images is given in Table 2.5.

Table 2.4	Scheme for assessing scenarios in this study
Name	**What is the name of the study?**
1. Source/report reference	What was the main report used for the current comparison?
2. On-line source	Where can you find out more online?
3. Sponsor	Who commissioned the scenario study?
4. Geographical scope	What countries does the study/project cover?
5. Spatial unit	On what spatial level are the scenarios analysed?
6. Objective of the scenarios	What was the aim of the scenarios?
7. Number and names of the scenarios	
8. Time scale	What is the start and end year of the scenarios?
9. Nature of the scenarios	Are the scenarios predictive, explorative or normative?
10. Nature of data used	Are data quantitative or qualitative?
11. Method of data collection	Was participatory methods and/or desk research used?
12. Temporal nature of the scenarios	Do scenarios describe a chain development or a snap-shot at the end?
13. Nature of the variables	Are the used variables homogeneous or heterogeneous?
14. Inclusive or imaginative approach of scenarios	Is the 'real' future hopefully among the described scenarios or is a group of possible futures described, which do not need to be plausible?
15. What are the drivers in the scenarios?	What are the exogenous and the endogenous drivers?
16. Methodology for calculating scenarios	What methodology has been used: - extrapolating past trends; - models (specify which); - expert judgement; - other (specify)?
17. Variables used to describe the images of the rural future	Which variables are used to describe the rural future?

Table 2.5	Scheme for describing the images of the rural futures in the scenario studies
Name	**What is the name of the study?**
1. Name of the scenario	Indicate name (f.i. baseline, liberalisation scenario, regionalisation scenario).
2. Description of scenario	Describe endogenous and exogenous drivers.
3. Image of the rural future	Describe rural futures and distinguish the following items: 3a general developments; 3b sectoral employment and employment growth; 3c agriculture; 3d landscape, nature and biodiversity; 3e other considered items.

3 Scenario studies of rural areas in the EU

3.1 Introduction

In this chapter we provide an overview of a number of scenario studies on rural areas in the EU (Table 3.1). In section 3.2 we start with a review of these studies by using the assessment scheme presented in Table 2.5. In section 3.3 we describe the images of the rural futures according to the reviewed scenario studies. For this description, we use the scheme given in Table 2.6. Finally, in section 3.4 we briefly discuss some scenario studies of rural Europe that focus on parts of the rural world or that are currently undertaken.

Table 3.1 Overview of scenario studies reviewed in this study

Name of the study	Published in	Period considered in the scenarios
ESPON	2006/7	2000-2030
EURURALIS	2008	2000-2030
SCENAR 2020	2006	1990/2005-2020
SENSOR	2006	2005-2025
PRELUDE	2007	2005-2035
SEAMLESS	2007	2001/2010/2020
Agriculture in the overall economy	2007	2005-2020

3.2 Review of current scenario studies

In this section we review the scenario studies that are specified in Table 3.1 by using the assessment scheme developed in the previous chapter.

3.2.1 ESPON

The ESPON project 3.2 on 'Spatial scenarios and orientations in relation to the ESDP and cohesion policy' (ESPON) has the objective to investigate which major changes can be expected in the global driving forces which shape the European territory, and to anticipate how different policy systems would themselves impact on the territory (ESPON project 3.2, 2006; ESPON project 3.2, 2007). It was funded under the ERDF and co-financed by EU member states, Norway and

Switzerland. The study covers EU27, Norway and Switzerland on NUTS 2/3 level. Four scenarios were designed: a baseline (trend perspective), a competitiveness-oriented, a cohesion-oriented and a pro-active scenario: the chosen path. The first three scenarios are best described as explorative whereas the pro-active scenario is normative by answering the question: how do we need to behave if we wish to achieve a certain future?

Both quantitative and qualitative data have been used. The method applied was to combine the results of literature reviews, creative thinking and workshops with the ESPON database and the outcomes of model calculations. Two models have been designed and used: the Macroeconomic Sectoral Social and Territorial (MASST) model and the Know Trans European Network (KTEN) model. The MASST model is able to forecast trends in real GDP, population and migration flows at NUTS2 level till 2015; KTEN is a passenger and freight traffic forecast metamodel developed to facilitate a strategic analysis of the trans-European transport networks at NUTS3 level. First, nine thematic scenarios have been developed: demography and migration; transport; energy; economy; governance; enlargement; rural development; climate change; socio-cultural evolution and integration. These were then combined in the four integrated scenarios. The drivers of the scenarios can be divided into four exogenous drivers: (1) accelerating globalisation; (2) rising energy prices; (3) stronger external immigration; and (4) emerging climate change; and three endogenous drivers: (1) population ageing; (2) struggle to promote competitiveness and improve the living environment; and (3) public policies connected to R&D, transport, trade liberalisation and EU enlargement.

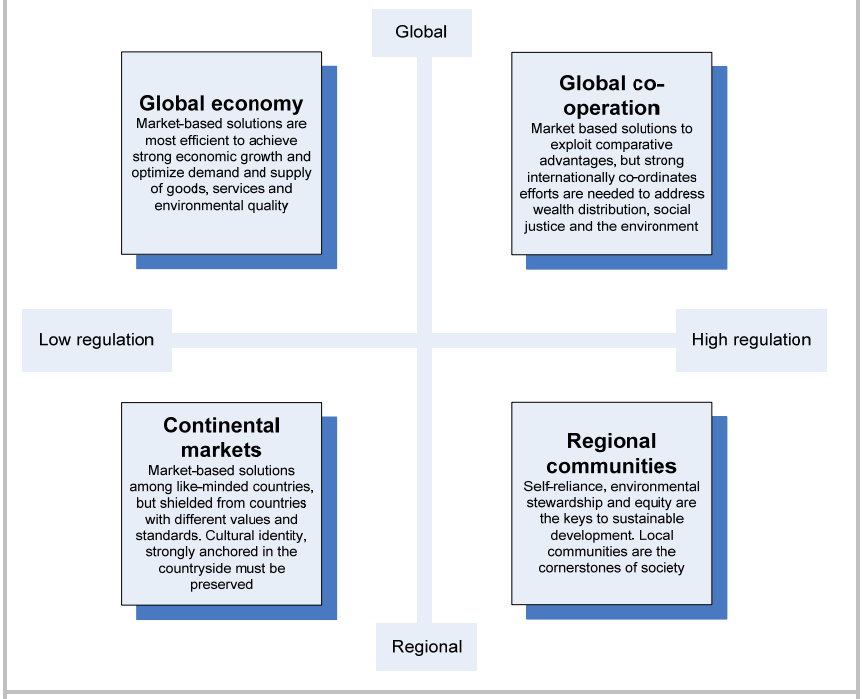
The result is a snapshot of 2030, but also the path of main policy events 2000-2030 is shown. An inclusive approach is used and heterogeneous variables describe trends in EU enlargement, demography, economy, energy, transport, rural development, governance and climate change.

3.2.2 EURURALIS

In Eururalis the objective is to explore future developments of rural areas in Europe within a dynamic global context (Rienks, 2008; Westhoek et al., 2006). The project was funded by the Dutch Ministry of Agriculture, Nature and Food Quality, it covers the EU27 on a spatial unit varying from grid level (km^2) to regional level (NUTS2/3) and Member State level. Furthermore, it also covers global impacts.

Scenarios are based on four different world visions, derived from different degrees of global market integration (globalisation versus regionalisation) and different levels of policy regulation (equity versus efficiency) leading to four scenarios: (1) Global economy (focus on efficiency in a globalised world); (2) Continental market (focus on efficiency in a regionalised world); (3) Global cooperation (focus on equity in a globalised world); and (4) Regional communities (focus on equity in a regionalised world) (figure 3.1). The scenarios are explorative. Data are mainly quantitative, but qualitative storylines have also been produced for the description of the scenarios.

Figure 3.1 **Four contrasting futures used in Eururalis**



Source: Westhoek et al. (2006).

Global driving forces are global demography and macro-economic growth. These driving forces set the demand for food and fuel. CAP and EU policies on biofuel may not completely halt or reverse global trends, but are assumed to diminish negative effects on farm income, farm structure and land abandon-

ment. The drivers are used in a multi-model framework with a general equilibrium model at world level called LEITAP, an integrated assessment model at world level called IMAGE and a spatial explicit land-use change model called CLUE-s.

The results are given as snapshots, with additional shocks introduced in 2010 and 2020. Heterogeneous variables are used, such as employment, agricultural employment, biodiversity, carbon sequestration, GDP, real farm income, agricultural land, biofuel cropland and semi-natural land. A tool has been developed where the end-user can change policy variables in the four world visions and see the impact on the abovementioned social, economic and environmental indicators.

3.2.3 SCENAR 2020

The objective of the SCENAR 2020 was the identification of future trends and driving forces that will be the framework for the European agricultural and rural economy on the horizon of 2020 (Nowicki et al., 2006). It was financed by DG Agri of the European Commission and it covers the EU27 at the level of NUTS2/3 and HARM2 regions.

Three explorative scenarios were constructed: a baseline scenario (trend) and two policy framework scenarios with assumptions on the CAP and the WTO Doha Development Round. The two alternative scenarios are a regionalisation scenario and a liberalisation scenario for the projection period 2006-2020. Quantitative data are used. The models ESIM, LEITAP, CAPRI and CLUE-S are used to analyse the scenarios. As exogenous drivers demography, macro-economic growth, consumer preferences, agri-technology, and world markets were used. Endogenous (policy related) drivers refer to CAP (market policies, direct payments, rural development policy), biofuels, enlargement, WTO and other international agreements, as well as environmental policies.

The results are given as a snapshot. The variables are heterogeneous: economic, social and environmental, with a focus on agriculture (production, income, land use, et cetera) and rural development (economy, employment, demography, et cetera).

3.2.4 SENSOR

The objective of the SENSOR project is to analyse the changes that different policy options will cause on land use and sustainability (Kuhlman et al., 2006;

Helming et al., 2008). The project is funded under FP6 of the European Commission. It covers EU27 at the level of NUTS2/3 and at kilometre grid.

Within the SENSOR project one baseline is compared against five scenarios called policy cases: financial reform, biofuel, biodiversity, forest strategy and tourism transport. The scenarios are predictive: what happens if policy X is changed? The data is mainly quantitative and derived from large databases (within models or externally), but for some indicators a qualitative approach has been used. The drivers are economic growth outside the EU25, demographic change in the EU25, changes in the labour participation rates in the EU25, the world oil price, R&D expenditure in the EU25, as well as institutions and cultural change (i.e. values and patterns of behaviour). The policy cases are simulated in a closely linked set of models: NEMESIS, CAPRI, CLUE-S and EFISCEN.

The results are given as a snapshot for a large number of social economic and environmental indicators. These are fed into the web-based policy assessment tool SIAT, that generates the impact assessment under the different scenarios that the end-user can change.

3.2.5 PRELUDE

The objective of PRELUDE (Prospective environmental analysis of land-use development in Europe) is to describe a range of possible futures of Europe, which are meant to inspire strategic thinking about some of the key challenges that Europe may face in the future in the field of land-use, agriculture, rural development and the environment (EEA, 2007).[1] It covers the EU25 plus Norway and Switzerland on the level of NUTS 2 plus a 10-minute latitude and longitude spatial grid for land use. It was funded by the European Environmental Agency (EEA).

Five scenarios were developed starting with disruptive events in the near future: Great Escape (Europe of contrast); Evolved Society (Europe of harmony); Clustered Networks (Europe of structure); Lettuce Surprise U (Europe of innovation); and Big Crisis (Europe of cohesion). The nature of these scenarios is explorative and the data used is both quantitative and qualitative. Data were collected in an iterative approach, in which a panel of stakeholders developed qualitative storylines and in which experts underpinned and complemented the

[1] PRELUDE emphasises the narration; see: www.eea.europa.eu/multimedia/interactive/prelude-scenarios/.

storylines with data and quantitative modelling. The scenarios were calculated through model simulations, with spatial allocation rules applied and combined with qualitative assessments. The drivers were: environment (climate change, environmental awareness, renewable energy), solidarity and equity (social equity, human behaviour, quality of life, health concern), governance and intervention (policy intervention, subsidiary), agricultural optimisation (agricultural intensity, international trade, self-sufficiency), technology and innovation (technological growth), economy and population (population growth, ageing society, settlement density, internal migration, immigration, daily mobility and economic growth).

The result is a snapshot and described in heterogeneous variables: land use, agriculture, rural development and the environment in the EU territory.

3.2.6 SEAMLESS

The objective of the SEAMLESS project was to identify and explore a range of possible futures of agricultural systems under alternative agricultural and environmental policy options in the EU25 (Perez et al., 2007; Belhouchette et al., 2007; van Ittersum et al., 2008). It was funded under FP6 by the European commission and covers the EU27 plus Norway and Switzerland. Six spatial scales are used in the project: field, farm, region (NUTS2), country, continent and global.

In the project a baseline scenario, a baseline scenario has been developed to analyse the effects of the current CAP and environmental policies on agricultural markets in 2013 and 2020. In addition, numerous policy scenarios can be composed by selecting a general policy problem, a time horizon, a spatial scale, a set of policy options, a set of external driving forces, a set of biophysical, agro-management and farm contexts, and indicators in the tool developed for analysis of the scenarios. These explorative scenarios can be used for support in policy-impact assessment. The data are both quantitative and qualitative and was collected through desk research and expert participatory research. The drivers of the scenarios are inflation in the EU25, growth of GDP/capita in the world, demographic changes in the world, technical progress in the EU25, domestic policies (i.e. CAP implementation) in the EU25, common market organisations, trade policy, supply and demand at world markets, CAP budget, and climate change. The scenarios are calculated through a computerised, component-based integrated framework in which components refer to individual

models (EXPAMOD, CAPRI, GTAP and APES), databases and indicators, while a software infrastructure facilitates the linkage and re-use of the components.

The result is a snapshot for a large number of economic, social, environmental and institutional variables.

3.2.7 Agriculture in the overall economy

This project was funded by the European Commission with the objective to analyse the agricultural sector's interaction with and the contribution to the overall economy in the EU till 2020. Furthermore, the project analyses the impact of agricultural policies and the developments in the agricultural sector on the overall economy (Banse and Grethe, 2007). It covers the EU27 at the regional level of member states.

The scenarios refer to a baseline and two alternative scenarios: full liberalisation (including a number of sub-scenarios: full market liberalisation with abolishment of market policies, abolishment of direct payments with maintenance of market policies, and abolishment of quota and intervention of dairy products) and a more demanding biofuel directive. The scenarios are explorative. The data used are quantitative and derived from SCENAR 2020 and from the GTAP database. The drivers are closely related to the SCENAR 2020 study: world population growth, world GDP growth, consumer preferences, agri-technology, supply and demand at world markets, no further EU enlargement, CAP and trade policies. The scenarios are calculated through an integrated modelling framework with LEITAP (economy wide general equilibrium model) and ESIM (partial equilibrium model of agrifood markets in the EU).

The result is a snapshot with heterogeneous variables such as (sectoral) GDP growth, agricultural markets, and agricultural land use.

3.3 Description of rural Europe according to the scenarios

In this section we describe the images of the rural futures in the EU according to the various scenario studies. For this description, we use the scheme designed in Table 2.6 and we place ourselves in the end year of the scenario. It appears that the completed schemes are quite lengthy. That is why we briefly describe the rural images here, whereas we present the completed assessment schemes in Appendix Tables A2.1-A2.19. The SENSOR and SEAMLESS projects both design interactive tools for impact assessment, which are currently only

available as prototypes. Therefore, it is not possible to say something about the rural future in the EU based on these two projects (SENSOR, 2008; SEAMLESS, 2008).

3.3.1 ESPON: an image of the rural future

ESPON: baseline scenario

In the baseline or trend scenario, globalisation has a strong and accelerating influence on the process of creation and destruction of jobs. Metropolitan regions with advanced technologies tend to benefit, whereas regions with low or intermediate technologies tend to loose. The former pentagon (London-Paris-Milan-Munich-Hamburg) of the early 2000s, has expanded along the main transport corridors. Large cities in the periphery of Europe do not manage to catch up with global economic integration and advanced technologies and remain rather isolated in their economic development process. Water shortage will become an increasingly serious problem in Southern Europe due to the increase in the drought trend for this area. This drought will significantly reduce the productivity of agriculture and will threaten tourist development. Forest fires in Southern Europe have destroyed traditional landscapes. Although Natura 2000 covers most valuable natural areas, connectivity between those protected areas through ecological corridors is not fully reached. Disparities among rural areas have increased by 2030. Rural areas in the proximity of large cities and rural areas that are attractive for residential and tourist functions (coastal areas, attractive valleys, mountain areas, Mediterranean regions with a favourable climate) experience population growth. A significant number of remote rural areas, especially in Northern, Central and Southern Europe, have more or less been abandoned.

ESPON: competitiveness-oriented scenario

In the competitiveness-oriented scenario all efforts are concentrated on the objective of increasing global competitiveness. Technological development is the cornerstone of the new policies, and budgets for other policies are severely cut. Europe gives up large segments of its economic structure with dwindling productivity. The area of concentration of flows and activities covers only parts of the former pentagon (London-Paris-Milan-Munich-Hamburg). Water shortages during dry summers in the pentagon and more serious drought in Southern Europe (abandonment and desertification) are expected. Net decline of biodiversity in Natura 2000 areas has been slowed down, but not stopped. Disparities in rural

regions increase with intensive agriculture in fertile rural areas, abandonment in less-favoured areas, external dependency of large energy companies in rural regions in the NEU12 and development of residential and tourist economies in attractive rural regions.

ESPON: cohesion-oriented scenario

In the cohesion-oriented scenario, the main focus is the enhancement of less favoured regions, as the economic and social costs of de-vitalised regions are perceived as extremely high in the long run. The former pentagon (London-Paris-Milan-Munich-Hamburg) of the early 2000s, has expanded and includes a larger number of cities in the periphery of Europe. Population growth has occurred in many areas, due to a new upturn in birth rates (amplified by family policy), economic growth in peripheral regions and strictly regulated and targeted migration strategies. A main priority is the development of an efficient transport infrastructure. In addition, support is also given to strategic regional transport axes. Environment is one of the pillars of European solidarity and the negative impact of climate change on rural regions in Southern Europe has been less strong than in the trend scenario due to support for adaptation measures. Water stress problems have been reduced through policy measures. Rural development policies favour the maintenance of natural and cultural heritage. Efforts are made to prevent forest fires in Southern Europe by better forest management. Structural funds together with strong rural development policies lead to a high degree of economic diversification. Disparities in rural regions are low: the differences in development between strongly performing rural areas located in and around metropolitan regions and the more remote and declining rural regions has been small, as this last group was strongly supported. Nevertheless, a number of remote rural regions continue to face decline and depopulation.

ESPON: pro-active or roll-back scenario

The roll-back scenario is focused on a knowledge based and highly innovative economy. Main investments are in increased productivity such as technology and training. A large number of (flexible) service and technology enterprises are competing on the world market - location is driven by knowledge centres. The 'pentagon' is extended and through reinforced territorial cooperation between macro-regions other strong clusters have evolved: 'Baltic Sea region', 'Eastern square', South-East (Istanbul, Athens, Bucharest Sofia), 'Latin Arch' and South-West Europe. The population is older than in early 2000s with some really 'old' regions that show lower population densities and reorientation towards residen-

tial economies. There is an extensive network of high-speed public transport both in metropolitan and rural areas. Freight traffic has changed and the inland waterways have increased in importance. Structural impacts of climate change are especially strong in Southern Europe (agricultural production) and mountainous areas (less snow, land slide risk) where adjustments have been necessary. Strong dynamics in rural areas were caused by changes in policies and strong development of biomass and energy crops. Rural areas in Southern Europe are experiencing difficulties due to climate change whereas northern rural areas experience an advantageous development. By 2030 rural areas are more diversified. More distant from metropolitan regions, medium-sized cities have played an important role for services and employment. Remote rural areas without larger cities continue to decline; active spatial planning made this shrinking 'intelligent'. Innovative approaches to services keep accessibility also high in marginal areas (mobile health care and mobile libraries).

3.3.2 EURURALIS: four world visions

Eururalis: Global Economy

The Global Economy scenario depicts a world with fewer borders and less government intervention, in which trade barriers are removed and in which there is an open flow of capital, people and goods, leading to a rapid economic growth, of which many (but not all) individuals and countries benefit. There is also a strong technological development. Nature and environmental problems are not seen as a priority of the government. Total employment increases between 2001 and 2030 whereas employment in agriculture decreases. With regard to territorial disparities, in particular, rural regions in the NEU12 lag behind as the exodus of agricultural labour cannot be absorbed by the other sectors of the economy. Landscape will change due to urbanisation and abandonment of agricultural land, which will lead to increases in human use in densely populated areas and to increases in nature development in less populated areas. Carbon sequestration will decrease up to 2010, thereafter it increases. There is land abandonment in marginal regions in the EU15; as a result traditional farmland landscapes disappear.

Eururalis: Continental Markets

The Continental Markets scenario describes a world that is divided into regional blocks. The EU, USA and other OECD countries are together one of the blocks. Other blocks refer to Latin America, the former Soviet Union and the Arab world.

Each block is striving for self sufficiency, in order to be less reliant on other blocks. Agricultural trade barriers and support mechanisms continue to exist. A minimum of government intervention is preferred, resulting in loosely interpreted directives and regulations. There is a strong decline in agricultural employment. Although economic growth is rather high, regional income disparities persist. As for territorial disparities, rural regions in the NEU12 lag behind as the exodus of agricultural labour cannot be absorbed by the other sectors of the economy. Strong economic growth will lead to an increase in the built-up area and the protection of agriculture will lead to a high demand for agricultural land. Both these factors will exert pressure on natural areas and valuable landscapes might be lost. Carbon sequestration will decrease dramatically in the EU15 due to an increase in arable land, in the NEU12 agricultural land will decrease and therefore the sequestration will increase. There is land abandonment in marginal regions in the EU15; as a result traditional farmland landscapes disappear.

Eururalis: Global Co-Operation

The Global Co-operation scenario presents a world with successful international co-operation, aiming at a reduction of poverty and environmental problems. Trade barriers have been removed. Many aspects are regulated by the government, like carbon dioxide emissions, food safety, and maintenance of cultural and natural heritage Economic growth in the NEU12 exceeds that in the EU15. With regard to territorial disparities, rural regions in the NEU12 lag behind as the exodus of agricultural labour cannot be absorbed by the other sectors of the economy. Total employment increases and employment in agriculture decreases. Regional income disparities persist. Landscape will be shaped by the concentrated urbanisation and the enhancement of the NATURA2000. Carbon sequestration will increase in both the EU15 and in the NEU12 There will be land abandonment in marginal regions in the EU15; as a result traditional farmland landscapes disappear.

Eururalis: Regional Communities

The Regional Communities scenario shows a world of regions, in which people have a strong focus on their local and regional community and prefer locally produced food. Agricultural policy strives at self sufficiency and ecological stewardship. This world is strongly regulated by government interventions, resulting in restrictive rules in spatial policy and incentives to maintain small-scale agriculture. Economic growth in this scenario is relatively low. In particular, rural regions in the NEU12 lag behind as the exodus of agricultural labour cannot be

absorbed by the other sectors of the economy. Both total and agricultural employment decreases. Regional income disparities persist. Small changes in landscape spread over all land uses. Initially carbon sequestration will decrease, but due to land abandonment it will eventually increase. There will be land abandonment in marginal regions in the EU15; as a result traditional farmland landscapes disappear.

In order to facilitate the comparison of the four Eururalis scenarios, we summarised their relative scores on main indicators used in the assessment schemes in Tables A2.5-A2.8 (Table 3.2). The Global Economy scenario shows the highest employment and GDP growth rates and the lowest levels of agricultural employment, real farm income and biofuel cropland in 2030. The Regional Communities scenario on the other hand, scores lowest on employment and GDP growth rates, but shows the highest level of agricultural employment and biofuel cropland.

Table 3.2 **Relative score on the main indicators in 2030 in the four scenarios of Eururalis**

	Global Economy	Continental Markets	Global Cooperation	Regional Communities
Employment	☺☺	☹	☺	☹☹
GDP	☺☺	☺	☹	☹☹
Agricultural employment	☹☹	☹	☺	☺☺
Real farm income	☹☹	☺☺	☺	☺
Biofuel cropland	☹☹	☹	☺	☺☺
Agricultural land	☺	☺☺	☹☹	☹
Biodiversity	☺	☹☹	☺☺	☹
Carbon sequestration	☺☺	☹☹	☺☺	☺☺
Semi-natural land	☺☺	☹☹	☺☺	☺☺

☺☺: highest score; ☺: one but highest score; ☹: one but lowest score; ☹☹: lowest score.
Source: Eururalis; own adaptation.

3.3.3 SCENAR2020: an image of agriculture

SCENAR2020: baseline scenario

In the baseline scenario territorial disparities persist; lagging regions are especially located in Central Europe and rural parts in Denmark, Sweden, Finland, Germany and France. The share of agriculture and food processing in the econ-

omy decreases. The sectoral employment in agriculture and industry decreases and employment in services increases. In both crop and livestock production there is a small annual growth in the EU25. The cereals and oilseed area decreases between 2005 and 2020, and the production increases. The production of energy crops almost doubles. Production of beef decreases, poultry meat production increases. Cheese production increases slightly. The number of farms decreases by about 25%. In the EU25, 5% of the area faces a change in land use and there are relatively high land use changes in Italy, Portugal, Bulgaria, Romania, Poland and Denmark. Some land abandonment in marginal agricultural areas, especially in Scandinavia; however, this tendency is dampened by LFA policy.

SCENAR2020: regionalisation scenario

In the regionalisation scenario there is more government intervention compared to the baseline scenario. Territorial disparities also persist; lagging regions are especially located in Central Europe and rural parts in Denmark, Sweden, Finland, Germany and France. The share of agriculture and food processing in the economy decreases. The sectoral employment in agriculture and industry decreases for the EU15 as well as for the NEU10, whereas employment in services increases. Annual growth in crop production is about 1%; in livestock production it is about 0.75% in the EU25. The cereals and oilseed area decreases between 2005 and 2020, and the production increases. The production of energy crops doubles. Production of beef decreases slightly, whereas poultry meat production increases. Cheese production increases as well. The number of farms decrease by about 29%. In the EU25, 4% of the area faces a change in land use with relatively high land use changes in Italy, Portugal, Bulgaria, Romania, Poland and Denmark. Some land abandonment in marginal agricultural areas, especially in Scandinavia and South-Eastern France; however, this tendency is dampened by LFA policy. Changes in nutrient surpluses are small compared to baseline.

SCENAR2020: liberalisation scenario

This scenario is characterised by less government intervention compared to the baseline scenario. Territorial disparities persist; lagging regions are especially located in Central Europe and rural parts in Denmark, Sweden, Finland, Germany and France. The share of agriculture and food processing in the economy decreases. The sectoral employment in agriculture and industry decreases in the EU15 and in the NEU10. Employment in services increases. Annual growth in

crop production amounts to about 0.6% and in livestock production to about 0.7% in the EU25. The cereals area remains almost unchanged and the oilseed area decreases between 2005 and 2020. The production of both increases. The production of energy crops almost doubles. Production of beef decreases to almost half of the base year; poultry meat production also shows a sharp decline. Cheese production increases. The number of farms sharply decrease by about 47%. In the EU25, 9% of the area faces a change in land use, with relatively high land use changes in Italy, Portugal, France, Germany, Spain, the UK, Poland and Denmark. Land abandonment is high, especially in Scandinavia, Southern France, Scotland, Germany, Spain and Italy, as there is no LFA policy to protect the marginal areas. Changes in nutrient surpluses are small compared to the baseline scenario, but more regions experience a decrease than in the regionalisation scenario.

3.3.4 PRELUDE: images of disruptive events

PRELUDE: great Escape - Europe of contrast
Disruptive event: Societal tension builds up as the impoverished and poor immigrants move to urban city centres. People who can afford leave major cities and settle in rural areas; the wealthiest of them settle in so-called gated communities. After 2015 more and more disadvantaged members of society move to rural areas and settle outside the gated communities. They provide basic services, private health, education, leisure and security to people living in the gated communities.

The economy flourishes, with a high level of technological innovation. Conditions for immigration are eased in order to fill the gaps in the labour force. Social inequalities rise, especially in urban areas. Overall economic growth amounts to 2.8% per year, but with a distinct split between urban areas (2.3%) and rural areas (2.9%). This split increases the separation between affluent communities in rural areas and the poor living in urban centres. Due to the low environmental awareness and the limited diversification of energy sources, demand for biofuels does not strongly increase. Profound landscape changes take place in this scenario: cropland decreases by 37% and grassland by 35%. In the Mediterranean, Eastern Europe, South-Western France, the Massif Central, Central Spain, the Netherlands and Norway, however, the decrease in agricultural land is even more than 50%. Nature conservation legislation is weakened, leading to a reduction in the number of protected sites (1.6% p.a.). The settlement

area is extended by 3%. The largest urbanisation will be in areas where in 2005 less than 5% of the land was urban.

PRELUDE: evolved society - Europe of harmony
Disruptive event: Intensified flooding that cumulate into several weeks of heavy flooding, leaving hundreds of thousands of people in Europe without a home. A subsequent international energy crisis after a series of terrorist attacks on oil pipelines causing oil prices to sky-rocket. The running out of reserves in many countries makes the search for new ways of producing energy inevitable.

Due to the revival of the countryside, high transportation costs and the advancement of new technologies, many people work and live in semi-rural, non-flooding areas without travelling too much. Overall economic growth is moderate at 1.5% p.a. (current level) and population growth is also similar to current growth rate (0.12% p.a.). Renewable energies are strongly promoted; the area for biofuel production increases by 0.3% p.a. Agricultural area remains approximately the same. Only in areas that are prone to repeated flooding, such as South-Western France, western parts of Portugal and some alpine regions, cropland is reduced considerably. Overall, changes in land use are not dramatic, and extensive farmland with high nature value is relatively well conserved. Increase in settlement areas in Eastern Europe result in an increase in demand for land for infrastructure in Eastern Europe, with likely negative impacts on the landscape. Net migration from the most densely populated urban areas towards peripheral regions, in particular, from west to east. As a result, urban population decreases by 0.7% p.a. and rural population increases by the same rate. There is an overall increase in the settlement area in Europe of 3%.

PRELUDE: clustered networks - Europe of structure
Disruptive event: Environmental awareness increases as urban air pollution intensifies. Migration away from polluted urban areas is encouraged.
Fourteen new medium-sized cities of 250,000 inh. outside the main urban centre in Europe are created. Smaller settlements are created as well in peri-urban areas. Belts of protected cultural landscapes are created in urban areas, serving both recreational and high quality food production purposes. The new cities generate major local changes in infrastructure, new employment opportunities and activities in peripheral regions. Due to the migration of 3.5 million people, income in the centre of Europe declines at the benefit of the periphery. The overall economic growth is 3.5% p.a. Growth in urban areas (3.7% p.a.) exceeds that in rural areas (3.1% p.a.). Deepened international trade relations lead

to marginalisation of agriculture. Biofuels are partly subsidised. Because of large scale land abandonment, the amount of crop land (-35%) and grassland (-33%) strongly decreases, especially in the Mediterranean and eastern countries. Natural habitats develop, but to the detriment of high nature value farmland. Biodiversity and the quality of water, soil and air benefit from receding agriculture and the creation of greenbelts in urban areas. Rural economies are under pressure; agriculture loses much of its attractiveness for younger people. There is an outflow of high educated people to the urban areas and less skilled and older people stay in rural areas.

PRELUDE: lettuce surprise U - Europe of innovation
Disruptive event: A major food security crisis hits Europe in 2015. As crisis management fails, faith in central government and in the safety of Europe's food supply decreases strongly. An alternative food production and control regime as well as regional self-sufficiency with regard to food and energy are strived for.

Moderate economic growth of about 2.8% per year. Technological development focuses on environmentally friendly and sustainable technologies and is bottom-up driven rather than top-down. Population growth continues as now. As there is only a small rural to urban migration, there is no need for many new settlements. Due to technological innovations, new crop varieties are invented that enable higher yields with lower inputs. Agriculture in core production regions becomes high-tech, clean and relatively small scale. Due to increased productivity in agriculture, the amount of crop land (-40%) and grassland (-20%) decreases. The reduction of agricultural area and inputs leads to an increase in biodiversity and improvements in the quality of water, soil and air. Cultural landscapes are created and environmentally protected, so that abandoned agricultural land can be used for recreation. The increase in the land used for biofuels is 0.3% p.a. The small growth in settlement areas (+1.2%) is the lowest of all PRELUDE scenarios.

PRELUDE: big crisis - Europe of cohesion
Disruptive event: A series of environmental disasters in 2015 highlights Europe's vulnerability and inability to adapt effectively. Basically all major river systems of Europe flood following some terrible storms. Millions of Europeans are left homeless or in danger and try to flee. However, the transportation system collapses. Many people cannot escape from the flooded area and public catastrophe management is simply overwhelmed.

Geographically more balanced and sustainable growth in Europe. After the crises in 2015, economic growth is moderate at 2.5% per year. After 2015 agricultural intensity is very low and no further intensification takes place. The main focus is on landscape stewardship. A major shift in eating patterns away from meat is observed after 2015. Hence less grassland for grazing and less crop land for fodder production is needed. The use of crop land and grassland remains more or less stable, although in the flooding zones and within the 'blue kangaroo' agricultural land use decreases. As environmental awareness increases after 2015, more and more protected areas are designated. There is a slight increase of 1.2% in settlement area until 2035. This growth is due to sustained urban population growth in Europe.

3.3.5 Agriculture in the overall economy: an image of the role of agriculture

Agriculture in the overall economy: Baseline scenario

The share of agri-food sectors in total employment in the EU27 declines. The increasing income disparity is the main driver for the decline in the agricultural workforce, with agricultural wages growing less than wages outside agriculture. Apart from policies, the development of the agrifood sectors depends on technical progress in production on the one hand, and on the growth of population and income one the other hand. For the EU15, production is increasing for cereals and oilseeds and decreasing for sugar. For the NEU10 in contrast, production is stable for sugar and increasing for oilseeds and cereals. Beef production in the EU15 declines, whereas the production of pork, poultry and cheese increases. In the NEU10, animal production increases. Agricultural land use in the EU25 declines by 2% between 2005 and 2020. Biofuel production in the EU increases from 3.8MTOE in 2005 to 20.7MTOE in 2020. This is insufficient to meet internal demand: consumption of biofuel in the EU increases from 3.9MTOE in 2005 to 29.3MTOE in 2020.

Agriculture in the overall economy: Full liberalisation scenario

In this scenario, market price support (including intervention prices and border measures), direct payments, production quotas and the biofuel premium are abolished. The share of agri-food sectors in total employment declines in the EU27. This decline is slightly higher than under the baseline scenario. Compared to the baseline scenario, crop supply in the EU25 is about 13% lower in 2020 and livestock supply is about 8% lower. Sugar beet production decreases

most. Agricultural land use in 2020 will be 4% less than in the baseline scenario and will decrease from 152m. ha in 2005 to just below 142m. ha in 2020.

Agriculture in the overall economy: Full implementation of new EU biofuel directive

According to this scenario, a new biofuel directive is in force, which sets a mandatory minimum share of 10% of biofuels in total fuel consumption in the transport sector by 2020. The share of agri-food sectors in total employment in the EU27 declines. This decline is slightly lower than under the baseline scenario in the EU15 and similar to the baseline scenario in the NEU12 in 2020. The biodiesel price increases by 18% in 2020 compared to the baseline scenario. This has a positive impact on the overall price level for crops in the EU relative to the baseline scenario, but the price level for animal products declines, as livestock production increases due to lower feed prices (increased supply of by-products of the biofuel industry is used in animal feed). Agricultural land use in the EU25 declines by 1.6% between 2005 and 2020 (-2% in baseline scenario). Compared to the baseline scenario, both EU production and consumption of biofuel is higher in 2020. However, the EU production of 23 MTOE is insufficient to meet internal demand of over 34 MTOE. So imports of biofuel will rise further as compared to the baseline scenario.

3.4 Additional scenario studies - an overview

The comparative analysis in this chapter excludes a number of scenario studies that are currently undertaken or that explore some aspects of the rural future in the EU. In this section these scenario studies are briefly discussed.

In the scope of the sixth framework programme of the EU (FP6), FORESCENE sustainability scenarios have been developed. The approach used in this study is backcasting - which means that the starting point is the future with the targets one strives for, and the scenarios consist of the road to that point, specifying the decisions that need to be taken. The drivers in FORESCENE are all environmental; social and economic sustainability is not included in the study. Results of this study are expected in 2008 (FORESCENE, 2008).

AG2020 is analysing the future of agricultural world markets (in the year 2020). Alternative futures will be described and policy scenarios will be developed as to describe how politicians, civil servants, farmers and other actors can

steer towards desirable targets. The project started in January 2007 and there are no results available yet (AG2020, 2007).

In FARO-EU, a EU FP6 Specific Targeted Research Project, a set of storylines for socio-economic changes will be set up. The work is divided into a quantitative (modelling) and a quantitative (SWOT analysis) part. The scenarios will focus on EU agriculture and rural development policy. Results are expected by the end of 2008 (FARO, 2007).

MEA-Scope aims at developing a tool for ex-ante policy impact assessment of multifunctional agriculture. They used a set of models and analysed three scenarios: 'competitiveness'. 'rural viability' and 'environment' (Piorr, 2006).

LUMOCAP analyses land use changes caused by changes in CAP. The result of the project is a tool that will allow the end-user to change policies and to see the outcome in the year 2015. Drivers are socio-economic indicators and restrictions in land use are considered (RIKS, 2008).

4 Comparative analysis

4.1 Introduction

In this chapter we make a comparative analysis of the seven scenario studies described in the previous chapter: ESPON, Eururalis, SCENAR 2020, SEAMLESS, SENSOR, PRELUDE and 'Agriculture in the overall economy'. In this comparative analysis, we again use the assessment schemes presented in Tables 2.5 and 2.6. In section 4.2 we focus on a comparison of the methodological approach of the scenario studies. In section 4.3, we discuss the various images of the rural futures in the EU according to the scenario studies.

4.2 Methodological approach of the scenario studies

Spatial unit
All considered scenario studies use various spatial levels, 'Agriculture in the overall economy' being the exception. Usually, the spatial levels refer to the country level and to NUTS2, NUTS3 and/or HARM2 regions in the EU. Eururalis, SEAMLESS and SENSOR also focus at grid level, often in order to reflect on land use. The scenario study 'Agriculture in the overall economy' only takes the national level into account.

Objective of the scenario studies
On the whole, all scenario studies aim to explore future trends and driving forces, which shape rural areas in Europe within a dynamic global context, and to anticipate how different policy systems would themselves impact on rural areas. The precise meaning of 'rural areas' differs among the scenario studies, varying from a wide territorial approach to a more narrow sectoral approach. In PRELUDE and ESPON, for example, rural areas are perceived in terms of all people living and working in rural regions, whereas in SEAMLESS rural areas coincide with agricultural systems and in 'Agriculture in the overall economy' with the agricultural sector. Eururalis, SCENAR 2020 and SENSOR are in between, by focusing on agriculture in its broader socio-economic, environmental and regional context.

Scenarios used in the studies

The construction of a baseline scenario - derived from an extrapolation of past trends and policies - combined with a number of alternative scenarios with different degrees of policy intervention, appears to be the most common approach of the scenario studies. Usually, these alternatives refer to a liberalisation scenario with a low degree of policy regulation and a cohesion scenario with a high degree of policy regulation. The construction of scenarios in PRELUDE and Eururalis, however, deviates from the other scenario studies. PRELUDE does not use a baseline scenario and alternative policy scenarios, but assumes a number of disruptive events in the near future. These disruptive events are amongst others a strong decrease in societal solidarity, severe flooding, an international energy crisis, heavy air pollution in urban areas, a food security crisis and environmental disasters. These events provoke a series of 'new' population and policy responses, resulting in images of the rural future in Europe that highly deviate from the present situation in rural Europe. Eururalis neither uses a baseline scenario, but employs a set of four contrasting futures, derived from opposite dimensions of policy intervention and global market integration.

The nature of most scenario studies can be denoted as 'explorative': the scenarios address the question 'what can happen?' 'The chosen path' scenario in ESPON can be labelled as 'normative' as it tries to answer the question 'how can a specific target be reached?'

All scenario studies, apart from PRELUDE, apply an inclusive approach: their scenarios describe a set of alternative futures of rural Europe and it is hoped that the 'real' future is included in this set. PRELUDE, on the other hand, uses an imaginative approach. Its scenarios describe possible futures, which do not need to be plausible.

Timescale of the scenarios

The base year of the scenario studies refers to one or more years in the period 2000-2005. The end year varies from 2020 (SCENAR 2020, SEAMLESS, 'Agriculture in the overall economy'), 2025 (SENSOR), 2030 (ESPON, Eururalis) to 2035 (PRELUDE). On the whole, the period covered in the scenario studies ranges from 15 years in 'Agriculture in the overall economy' to 30 years in ESPON, Eururalis and PRELUDE. Most scenario studies show a snapshot of the situation at the end, but several studies (in particular ESPON and PRELUDE) also discuss main chain developments leading to the snapshot.

Use of data in the scenario studies

Eururalis, SCENAR 2020, 'Agriculture in the overall economy' and SENSOR are based on quantitative data; ESPON, SEAMLESS and PRELUDE use qualitative data as well. Desk research is the most common method for data collection in the scenario studies. In SEAMLESS, SENSOR and PRELUDE experts and stakeholders are also consulted. In the case of PRELUDE an iterative approach was applied, in which a panel of stakeholders developed qualitative storylines and in which experts underpinned and complemented the storylines with data and quantitative modelling. Variables used in the scenario studies are heterogeneous, and refer to economic, social and environmental issues. In ESPON, SEAMLESS and PRELUDE data on institutional indicators is also used.

Drivers of the scenarios

Drivers in the scenario studies are often divided into exogenous drivers and policy-related drivers. In all scenario studies, global macro-economic growth and demographic changes are included in the exogenous drivers. Demographic changes are reflected in various indicators, such as global population growth, population growth in the EU, population ageing, migration, labour market participation and settlement density. Policy drivers, either related to the CAP, biofuel, trade, EU enlargement, R&D, transport or the environment, are included in all scenario studies. In PRELUDE these drivers appear under the heading 'governance and intervention'. Other drivers in the scenario studies are:

- technological progress (Eururalis, SCENAR 2020, SEAMLESS, PRELUDE and 'Agriculture in the overall economy');
- rising energy prices (ESPON, SENSOR and PRELUDE);
- climate change (ESPON, Eururalis, SEAMLES, PRELUDE);
- consumer preferences (Eururalis, SCENAR 2020 and 'Agriculture in the overall economy');
- norms and values, i.e. institutions and cultural change (SENSOR), solidarity and equity (PRELUDE, Eururalis) and environmental awareness (PRELUDE).

Methodology for calculating the scenarios

All scenario studies use a multi-model framework for calculating values of economic, social, environmental and institutional indicators. These models refer to different spatial levels (world, EU, region, grid) and to different aspects of the rural world (economic growth, agricultural markets, land use, et cetera). Sometimes already existing models were used, like GTAP/LEITAP, ESIM, CAPRI and CLUE; in other cases new models were developed, such as the Macroeconomic

Sectoral Social and Territorial (MASST) model and the Know Trans European Network (KTEN) model in ESPON and the FSSIM-EXPAMOD model and the FSSIM-APES model in SEAMLESS. The existing models were used in more than one scenario study: GTAP/LEITAP in Eururalis, SCENAR 2020, SEAMLESS and 'Agriculture in the overall economy'; ESIM in SCENAR 2020 and 'Agriculture in the overall economy'; CAPRI in SCENAR 2020, SEAMLESS and SENSOR; and finally CLUE in Eururalis, SCENAR 2020 and SENSOR. In PRELUDE, the model simulations were combined with qualitative assessments, whereas in ESPON the outcomes of the model calculations were combined with the findings of literature reviews, creative thinking and workshops. In ESPON, first nine thematic scenarios were designed, and second, these were combined in the 'integrated' scenario.

4.3 Images of the rural futures in the EU according to the scenario studies

In this section, we try to give a broad outline of alternative rural futures in the EU. Considering the use of scenarios with different degrees of policy intervention in most scenario studies (Table 4.1), we first distinguish a number of rural futures in the EU derived from policy intervention:

1. rural future in the EU: baseline;
2. rural future in the EU: competitiveness;
3. rural future in the EU: cohesion.

As PRELUDE does not start from the degree of policy intervention, but assumes disruptive events in the near future, we also distinguish a number of rural futures in the EU according to disruptive events:

1. rural future in the EU: clustered networks;
2. rural future in the EU: lettuce surprise u;
3. rural future in the EU: big crisis.

Below we discuss each of these six images of the rural future in the EU by focusing on a number of main drivers and responses: population, globalisation, climate change, policies, agriculture, agricultural land use, landscape, nature and biodiversity and territorial disparities in rural Europe. Although the first three images include elements from different scenario studies, it appears that these elements do not differ to a high degree.

Table 4.1	Schematic overview of scenarios in the scenario studies			
Type of scenario	**Baseline**	**Competitiveness**	**Cohesion**	**Other**
PRELUDE		Great Escape - Europe of contrast	Evolved Society - Europe of harmony	Clustered Networks - Europe of structure Lettuce Surprise U - Europe of innovation Big Crisis - Europe of cohesion
ESPON	Baseline - trend scenario	Competitiveness oriented	Cohesion oriented	Proactive/roll back scenario: the chosen path
Eururalis		Global Economy Continental Market	Global Co-operation Regional Communities	
SCENAR 2020	Baseline	Liberalisation	Regionalisation	
Agriculture in the over-all economy	Baseline	Full liberalisation		Full implementation of a new EU biofuel directive

Rural future in the EU: baseline

- *Population* stabilises in the EU; however, remote rural regions face depopulation. External (legal and illegal) migration pressure from the southern and eastern part of the Mediterranean and Africa will continue to increase. Insufficient integration of these migrants boosts social and physical segregation in cities. Intra-European migration flows also increase: self-employed and retirees migrate from urban to rural areas, whereas young employed and students migrate from rural to urban areas.
- *Globalisation* has a strong and accelerating influence on the process of creation and destruction of jobs. Metropolitan regions with advanced technologies tend to benefit, whereas regions with low or intermediate technologies tend to loose. The urban centre of Europe expands along the main

transport corridors, in the direction of Rome, Barcelona, Madrid, Glasgow, Copenhagen, Oslo, Stockholm, Berlin, Warsaw, Prague, Budapest and Vienna. Large cities in the periphery of Europe do not manage to catch up with global economic integration and advanced technologies and remain rather isolated in their economic development process.

- *Climate change:* Drought has led to agricultural abandonment in areas in Southern Europe where irrigation is no longer possible and where alternative agricultural production could not successfully be envisaged.
- *Policies:* Further liberalisation of international trade and progressive reduction of CAP budget.
- *Agriculture:* The production of biomass and energy crops gives a new impetus. Agriculture in polders and deltas is becoming increasingly industrialised. As a consequence, many elements of the natural landscapes are removed. In other areas close to consumption centres and in large fertile areas (in the UK, France, Eastern Germany, North-West Poland, the Czech Republic, Slovakia, Hungary, Romania and Bulgaria), large-scale, highly mechanised agriculture employing very few people has been developed. On the other hand, in less fertile or less favourably located areas, especially those dominated by small farms, a more diversified evolution has taken place. Some of them successfully transform their profile towards rural tourism, handicrafts, organic farming, regional brands and energy crops, whereas in other LFA, especially in the periphery, farms are abandoned.
- *Agricultural land use:* On the whole, agricultural production in 2020 needs 91% of the agricultural land used in 2000/2002; biofuel needs 4% additional agricultural area in 2020. The number of farms sharply decreases by about 25%.
- *Landscape, nature and biodiversity:* Natura 2000 covers most valuable natural areas, however, connectivity between those protected areas through ecological corridors is not fully reached. Many natural areas in new Member States are converted into farm land. Forest fires in Southern Europe have destroyed traditional landscapes. Biodiversity is threatened by the pressure of infrastructure development, tourism, especially in attractive coastal and mountain areas, holiday home developments, intensification of agriculture in polders and deltas, the abandonment of farms in less productive and dry rural areas, and environmental damage.
- *Territorial disparities in Rural Europe:* Disparities among rural areas have been increased by 2030. Rural areas in the proximity of large cities and rural areas that are attractive for residential and tourist functions (coastal ar-

eas, attractive valleys, mountain areas, Mediterranean regions with a favourable climate) experience population growth. A significant number of remote rural areas, especially in Northern, Central and Southern Europe, have more or less been abandoned. Various types of intermediate situations can, however, also be observed, with some regions taking advantage of CAP support to stabilise their economic performance.

Rural future in the EU: competitiveness

- *Population:* Population increases in metropolitan regions and large cities due to significant immigration flows and revival of fertility rates. Due to lack of integration policies and decreasing societal solidarity, social unrests are more frequent than in the baseline scenario. As a reaction, gated communities are emerging in and around cities. Suburbanisation - because of metropolitan population growth, segregation and insecurity in cities - results in growing traffic, which increases pressure on the environment and natural areas.
- *Globalisation:* All efforts are concentrated on the objective of increasing global competitiveness. The economy flourishes, with a high level of technological innovation. Energy supply diversification by means of new generations of nuclear power plants, renewable energy sources, coal gasification and hydrogen technology. Europe gives up large segments of its economic structure with dwindling productivity. Territorial disparities between metropolitan areas and other areas not catching up with high tech development increase. The area of concentration of flows and activities covers only parts of the former pentagon (London-Paris-Milan-Munich-Hamburg), although it also extends along a few corridors to reach Vienna and Copenhagen and it includes major cities with a concentration of high tech employment in all Central European countries.
- *Climate change:* The situation described in the baseline scenario regarding drought and desertification in Southern Europe, water conflicts, increased hazards in river valleys and coastal and arid regions applies to a greater extent in this scenario. Measures to adapt its consequences are principally taken at international/global level.
- *Policies:* Rapid and radical liberalisation of CAP. Strong reduction of EU budget. Further liberalisation and privatisation of public services.
- *Agriculture:* Due to further liberalisation of agricultural markets and reduction of support schemes, agriculture intensifies, becomes high-tech and concentrates in areas that are optimal for production. Subsistence farming in peripheral areas.

- *Agricultural land use:* On the whole, agricultural production in 2020 needs 86% of the agricultural land used in 2000/2002; biofuel needs 4% additional agricultural area in 2020. The number of farms sharply decreases by about 47%.
- *Landscape, nature and biodiversity:* Intensive farming, accelerating urban sprawl, abandonment of less favoured areas and a more serious damage by natural hazards contribute to significantly reducing the attractiveness of landscapes. The creation of large wind energy parks by energy companies has a detrimental effect on the quality of natural and cultural landscapes. Net decline of biodiversity in Natura 2000 areas has been slowed down, but not stopped.
- *Territorial disparities in Rural Europe:* Increase in disparities, with diverse developments:
  - fertile rural areas with intensive agriculture, producing both food and energy products;
  - less-favoured rural areas, where agriculture, and low-technology SMEs are fighting for survival and which progressively become abandoned by population and services;
  - rural areas in the new Member States where large energy companies conclude long-term, but unfavourable contracts with farmers for the production of energy crops, thus increasing the external dependence of these areas while maintaining a low level of economic welfare;
  - rural areas around metropolitan regions and large cities, where commuters and enterprises locate, diversify their economic base.

Rural future in the EU: cohesion

- *Population* growth in many areas, due to a new upturn in birth rates (amplified by family policy), economic growth in peripheral regions and strictly regulated and targeted migration strategies. Net migration from the most densely populated urban areas towards peripheral regions, in particular, from west to east. As a result, urban population decreases by 0.7% p.a. and rural population increases by the same rate. Ethnic minorities and other less privileged groups have become better integrated in the labour market. This contributed to reducing social and physical segregation in cities and gated communities did not emerge.
- *Globalisation:* Enhancing the vitality of less favoured regions is a main objective, as the economic and social costs of de-vitalised regions is perceived as extremely high in the long run. Support for technological development is

concentrated on less-favoured regions. Lower GDP growth compared with the baseline scenario: the winning regions are the non-metropolitan areas, whereas growth in metropolitan areas slows down. The former pentagon (London-Paris-Milan-Munich-Hamburg) of the early 2000s, which groups the areas of concentration of flows and activities, has expanded to a larger extent than in the baseline scenario, and includes a larger number of cities in the periphery of Europe. Due to the revival of the countryside, high transportation costs and the advancement of new technologies, many people work and live in semi-rural, non-flooding areas without travelling too much.

- *Climate change:* The negative impact of climate change on rural regions in Southern Europe has been less strong than in the baseline scenario due to support for adaptation measures, like investments in water saving irrigation techniques, cultivation of less-water demanding crops, policies on halting nitrate diffusion and measures to prevent flooding of rivers.
- *Policies:* Ambitious European and national policies in favour of environmentally sustainable regional development. Maintaining the EU budget, reinforcement of structural funds and concentration on weakest regions. Minor CAP reforms, but shift from pillar 1 to pillar 2, priority given to Direct Payments from pillar 1 in less developed rural regions, priority given to environmental and animal health criteria, promotion of quality products, active policy for economic diversification in rural areas, including SMEs, tourism and residential functions. Active multi-level territorial governance in areas supported by structural funds, more public intervention.
- *Agriculture:* Production of bio-energy crops has helped to counterbalance the decline of a number of traditional weakly competitive agricultural activities. Farming is high-tech and increasingly organic. Farming intensity decreases. Large-scale agriculture increases most in rural areas with low land prices in Poland and the Baltic States. In the fertile areas of France, Germany and Poland, agricultural production further modernises and food production competes here strongly with the production of energy crops. Many intensive cattle farms and horticulture settle in agro-production parks.
- *Agricultural land use:* On the whole, agricultural production in 2020 needs 96% of the agricultural land used in 2000/2002; biofuel needs 4% additional agricultural area in 2020. The number of farms decreases by about 29%.
- *Landscape, nature and biodiversity:* Rural development policies favour the maintenance of natural and cultural heritage. Efforts are made to prevent forest fires in Southern Europe by better forest management. Overall, changes in land use are not dramatic, and extensive farmland with high nature value

is relatively well conserved. The increase in settlement areas in Eastern Europe result in an increase in demand for land for infrastructure in Eastern Europe, with likely negative impacts on the landscape.

- *Territorial disparities in Rural Europe:* Structural funds together with strong rural development policies lead to high degree of economic diversification in rural areas. The dichotomy between strongly performing rural areas located in and around metropolitan regions and the more remote and declining rural regions has been more modest than in the baseline scenario, as this last group was strongly supported. Nevertheless, a number of remote rural regions continue to face decline and depopulation.

Rural future in the EU: clustered networks

- *Population:* Urban air pollution intensifies. Migration away from polluted urban areas is encouraged. Construction of 14 new cities. Due to the migration of 3.5m. people out of the 'blue kangeroo', income in the centre of Europe declines at the benefit of the periphery. Environmental awareness increases.
- *Globalisation*: Globalisation propels economic growth. The new cities generate major local changes in infrastructure, new employment opportunities and activities in peripheral regions. The overall economic growth is 3.5% p.a. Growth in urban areas (3.7% p.a.) exceeds that in rural areas (3.1% p.a.).
- *Policies:* Strong coherent spatial planning policies. Fourteen new medium-sized cities of 250,000 inhabitants outside the main urban centre in Europe (the 'blue kangeroo') are created. Smaller settlements are created as well in peri-urban areas. Belts of protected cultural landscapes are created in urban areas, serving both recreational and high quality food production purposes.
- *Agriculture:* Deepened international trade relations lead to marginalisation of agriculture. Net agricultural production is reduced in Europe and imports increase. Agriculture continues and intensifies production only in the most favourable areas. These farms are internationally competitive. Biofuels are partly subsidised.
- *Agricultural land use:* Because of large scale land abandonment, the amount of crop land (-35%) and grassland (-33%) strongly decreases, especially in the Mediterranean and eastern countries.
- *Landscape, nature and biodiversity:* Natural habitats develop, but to the detriment of high nature value farmland. Biodiversity and the quality of water, soil and air benefit from receding agriculture and the creation of greenbelts in urban areas.

- *Territorial disparities in Rural Europe:* Rural economies are under pressure; agriculture loses much of its attractiveness for younger people. There is an outflow of high educated people to the urban areas and less skilled and older people stay in rural areas.

Rural future in the EU: lettuce surprise u

- *Population:* A major food security crisis hits Europe in 2015. An alternative food production and control regime as well as regional self-sufficiency with regard to food and energy are strived for. Population growth continues as now. As there is only a small rural to urban migration, there is no need for many new settlements.
- *Globalisation:* Focus is on enhancing the quality of life rather than economic growth. Environmental awareness grows, leading to wide demands for environmentally friendly produced food. Moderate economic growth of about 2.8% per year. Technological development focuses on environmentally friendly and sustainable technologies and is bottom-up driven rather than top-down.
- *Policies:* As crisis management during the food security crisis fails, faith in central government and in the safety of Europe's food supply decreases strongly. Political decentralisation becomes prominent. New communication technologies facilitate local participatory decision-making and open-source development of innovative technologies.
- *Agriculture:* Due to technological innovations, new crop varieties are invented that enable higher yields with lower inputs. Agriculture in core production regions becomes high-tech, clean and relatively small scale.
- *Agricultural land use:* Due to increased productivity in agriculture, the amount of crop land (-40%) and grassland (-20%) decreases by 2035. Increase in the land used for biofuels of 0.3% p.a.
- *Landscape, nature and biodiversity:* The reduction of agricultural area and inputs leads to an increase in biodiversity and improvements in the quality of water, soil and air. Cultural landscapes are created and environmentally protected, so that abandoned agricultural land can be used for recreation.
- *Territorial disparities in Rural Europe:* A small growth in settlement areas (+1.2%), mainly around medium- and small-sized cities and in peri-urban areas.

Rural future in the EU: big crisis

- *Population:* A series of environmental disasters in 2015 highlights Europe's vulnerability and inability to adapt effectively. Basically all major river systems of Europe flood following some terrible storms. Millions of Europeans are left homeless or in danger and try to flee. However, the transportation system collapses. Many people cannot escape from the flooded area and public catastrophe management is simply overwhelmed. After these crises, policies focus on a movement of population from the urban centre of Europe to its periphery. There is an increase of urban land use in the periphery of Europe and its population increase by 2% p.a. Simultaneously, population decreases by 2% p.a. in the 'blue kangaroo'.
- *Globalisation:* Geographically more balanced and sustainable growth in Europe. After the crises in 2015, economic growth is moderate at 2.5% per year.
- *Policies:* There is a widespread support for a strong coordination of a coherent set of new top-down policies for sustainable and regionally balanced development at European level. A special network of high-speed trains is established, making the cities in the periphery more attractive for working and living.
- *Agriculture:* After 2015 agricultural intensity is very low and no further intensification takes place. The main focus is on landscape stewardship. A major shift in eating patterns away from meat is observed after 2015. Hence less grassland for grazing and less crop land for fodder production is needed.
- *Agricultural land use:* The use of crop land and grassland remains more or less stable, although in the flooding zones and within the 'blue kangaroo' agricultural land use decreases.
- *Landscape, nature and biodiversity:* As environmental awareness increases after 2015, more and more protected areas are designated.
- *Territorial disparities in Rural Europe:* The increase in settlement area is 1.2% until 2035. This growth is due to sustained urban population growth in Europe, mainly in medium- and small-sized cities and in peri-urban areas.

5 Concluding remarks

In this study we explored alternative futures of rural areas in the EU. For this purpose, we made a comparative analysis of seven scenario studies of rural areas in the EU: ESPON, Eururalis, SCENAR 2020, SEAMLESS, SENSOR, PRELUDE and 'Agriculture in the overall economy'. Often, these scenario studies constructed a baseline scenario - derived from an extrapolation of past trends and policies - and a number of alternative scenarios with different degrees of policy intervention. Usually, these alternatives refer to a competitiveness scenario with a low degree of policy regulation and a cohesion scenario with a high degree of policy regulation. The scenarios in PRELUDE and Eururalis, however, deviate from this approach. PRELUDE assumes a number of disruptive events in the near future. These events provoke a series of 'new' population and policy responses, resulting in images of the rural future in Europe that highly deviate from the present situation in rural Europe. Eururalis employs four contrasting scenarios, derived from opposite dimensions of policy intervention and global market integration. The precise meaning of 'rural areas' differs among the scenario studies, varying from a wide territorial approach to a more narrow sectoral approach. The time horizon in the scenario studies varies from 2020 to 2035.

Six distinct images of rural areas in Europe

Depending on the assumptions made in the scenarios, smaller or larger changes in rural areas in the EU are anticipated as compared to the current situation. On the whole, by focusing on population, globalisation, climate change, policies, agriculture, agricultural land use, landscape, nature and biodiversity and territorial disparities in rural Europe, we were able to derive six distinct alternative futures of rural areas in Europe from the scenario studies. These could successively be labelled as: 1. baseline; 2. competitiveness; 3. cohesion; 4. clustered networks; 5. lettuce surprise u; 6. big crisis. Differentiations with regard to population in the various images of rural areas relate to population growth, immigration, the degree of integration of the immigrants, counterurbanisation, depopulation of remote regions, migration from western to eastern Europe, and the construction of new cities. Globalisation might foster economic growth in metropolitan regions which are able to catch-up with advanced technology developments, at the costs of regions with low or intermediate technolo-

gies. Climate change often refers to droughts in Southern Europe and floods, making parts of Europe unsuitable for living and/or agriculture. A high level of policy intervention could relief the disadvantages of globalisation or climate change, whereas low levels of policy intervention often result in increasing disparities among regions and groups of people. For agriculture many different futures are outlined: intensification, industrialisation, high-tech varieties with higher yields and lower inputs, focus on organic production, new impetus of biomass and energy crops, marginalisation and land abandonment. In 2035, projections of agricultural land use vary from twothirds to 100% of current land use. Landscape and nature might benefit from rural development policies or might suffer from forest fires. Territorial disparities in rural Europe might increase or decrease.

The assumptions on driving forces behind the various images of the future of rural Europe vary from conservative (extrapolation of current trends) to rather challenging expectations by means of disruptive events. The current financial crisis of the world economy seems to confirm that disruptive events are not pure imaginative events, but might be among the set of possible rural futures.

Makeable rural future?

The images of a competitive and cohesion rural future reflect the dichotomy in regional development policies of efficiency versus equity. A competitiveness approach with a low degree of policy intervention boosts economic growth and regional disparities, while a cohesion approach with a high degree of policy intervention results in slower economic growth with less regional disparities. So in order to arrive at a harmonised and sustainable rural future in 2030, the impression arises that cohesion policy could be recommended as a policy strategy. However, rural images like clustered networks, lettuce surprise u and big crisis reveal that main challenges for Europe's rural future are not necessarily contained within this dichotomy of competitiveness versus cohesion. On the contrary, these challenges require new policy approaches, that might depart in many respects from the policies applied up to now (ESPON Project 3.2, 2006). Moreover, the role of public policies in shaping the rural future should not be exaggerated. Rural Europe rather emerges from the interplay of global market forces and local responses by entrepreneurs, consumers and policy makers.

References

AG2020, *Project information*, downloaded on 22-11-2007 from: www.risoe.dk/Research/sustainable_energy/energy_systems/projects/AG2020.aspx. 2007.

Banse, M. and H. Grethe, *Agriculture in the overall economy*, Final Report to the European Commission, 2007.

Belhouchette, H., O. Therond, M. Adenaeuer, M. Kuiper, G. Bigot, J. AlkanOlsson and J. Wery et al., *Documentation of baseline and policy options to be assessed with Prototypes 2 and 3*, SEAMLESS Report No.33, SEAMLESS integrated project, EU 6th Framework Programme, contract no. 010036-2, www.SEAMLESS-IP.org, 120 pp, ISBN no. 90-8585- 121-1 and 978-90-8585-121-9. 2007.

Börjeson, L., M. Höjer, K-H. Dreborg, T. Ekvall and G. Finnveden, 'Scenario types and techniques: Towards a users' guide'. In: *Futures*, 38 (2006) 723-739.

EEA, *PRELUDE*, downloaded on 18-10-2007 from: www.eea.europa.eu/multimedia/interactive/prelude-scenarios/prelude. 2007.

EFMN, *2005 Mapping Report*, available on www.bimos.be/efmn/images/stories/pdf/reports/EFMN_Mapping_Report_2005.pdf. 2006.

ESPON Project 3.2, *Spatial Scenarios and Orientations in relation to the ESDP and Cohesion Policy*, ESPON project 3.2, Final report. 2006.

ESPON Project 3.2, *Scenarios on the territorial future of Europe*, downloaded on 10-12-2008 from: www.espon.eu/mmp/online/website/content/publications/98/1378/file_2995/espon3.2_60p._final_16-7-2007-c.pdf. 2007.

European Commission, *Scenar 2020 - Scenario study on agriculture and the rural world*, Final report, SCENAR 2020 Project. 2007.

EURURALIS, *Interactive tool*, downloaded on 20 October 2008 from: www.eururalis.eu/eururalis2.htm. 2008.

FARO, *Project information*, downloaded on 22-11-2007 from: www.faro-eu.org/. 2007.

FORESCENE, *Project information*, downloaded on 16 October 2008 from: www.forescene.net/. 2008.

IPCC, IPCC Workshop on New Emission Scenario, Laxenburg, Austria, 29 June - 1 July 2005. 2005.

Helming, K., M. Pérez-Soba and P. Tabbush (eds.), *Sustainibility Impact Assessment of Land Use Changes*. Berlin, Heidelberg. 2008.

Jansen, A. and Faith, S., 'Agriculture in Europe 2000 - an interim report on a cross-national research project'. In: *Futures*, October, 1973. 1973.

Kuhlman, T., P. LeMouël and C. Wilson, *Baseline scenario storylines*, Deliverable 2.1.1. SENSOR project. 2006.

Legg, W., 'Agriculture in the EEC - two scenarios to the year 2000'. In: *Futures*, June, 1980. 1980.

Notten, van P., J. Rotmans, M. van Asselt and D. Rothman, 'An updated scenario typology'. In: *Futures*, 35(2003) 423-443. 2003.

Nowicki, P., C. Weeger, H. van Meijl, M. Banse, J. Helming, I. Terluin, D. Verhoog, K. Overmars, H. Westhoek, A. Knierim, M. Reutter, B. Matzdorf, O. Margraf and R. Mnatsakanian, *Scenar 2020; Scenario study on agriculture and the rural world*. DG Agriculture and Rural Development, Brussels. 2006.

Piorr, A., Scenario development and modelling of policy impacts towards multifunctional agriculture in the EU project MEA-scope, Working paper presented at FORESCENE Workshop *Development of cpre elements of integrated sustainability scenarios for agriculture (Goal definition & Pre-Backcasting)*, Florence, October, 2006. 2006.

Pérez, I., G. Bigot, E. Josien, J.-P. Bousset and E. Majewsky et al., *Documentation of baseline and policy scenarios for Test Case 1*. Report No.23, SEAMLESS integrated project, EU 6th Framework Programme, contract no. 010036-2, www.SEAMLESS-IP.org, 33 pp, ISBN no. 90-8585-114-4 978-90-8585-111-0. 2007.

RIKS, *LUMOCAP project information*, downloaded on 16 October 2008 from: www.riks.nl/projects/LUMOCAP. 2008.

Rienks, *The future of rural Europe - an anthology based on the results of the Eururalis 2.0 scenario study*, Alterra. 2008.

SEAMLESS, *Project information*, downloaded on 22 October 2008 from: www.seamless-ip.org/. 2008.

SENSOR, *Project information*, downloaded on 22 October 2008 from www.zalf.de/home_ip-sensor/index.html. 2008.

Van Ittersum, M.K., F. Ewert, T. Heckelei, J. Wery, J. Alkan Olsson, E. Andersen, I. Bezlepkina, F. Brouwer, M. Donatelli and G. Flichman, 'Integrated assessment of agricultural systems - A component-based framework for the European Union (SEAMLESS)'. In: *Agricultural Systems,* 96 (1-3), p. 150-165. 2008.

Westhoek, H.J., M. van den Berg and J.A. Bakkes, 'Scenario development to explore the future of Europe's rural areas'. In: *Agriculture, Ecosystems and Environment,* 114 (2006) 7-20. 2006.

Appendix 1

Scenario studies designed in the 1970s and 1980s for the year 2000

In this appendix we discuss some scenario studies designed in the 1970s and 1980s for the year 2000. This may provide some perspectives on the possibilities and limitations of actually exploring the future through scenario studies. To get some perspective and to see how accurate scenarios are, we here describe two scenario studies, both looking to describe the situation in year 2000. They are quite different in style; one using an imaginative approach and the other using a reference scenario with variants.

In a study from 1973, national and European workshops were held to develop scenarios for the society in 2000 and the role of agriculture in that society (Jansen and Faith, 1973). The goal of the workshops was to create possible futures. The participants ended up with four 'key sketches' pointing in four different directions for the future.

Table A1.1 Review of Jansen and Faith scenarios

Name	**Jansen and Faith**
Theme	Society and agriculture
Time horizon	2000
Goals/aim	Create possible futures
Drivers	Not applicable
- Exogenous	
- Endogenous	
Scenarios and their main characteristic	
Alternative 1	Social liberal (individuality free market)
Alternative 2	Environment (sustainability, planned economy)
Alternative 3	Socialism (pleasure and leisure)
Alternative 4	Anti-capitalistic
Methods	Workshop
Results/outline future of rural areas in the EU	The scenarios are the result

The first key sketch shows a social liberal society where the individual has a lot of freedom, the market is left free and public welfare is important. Agriculture is not dependent on government aid and its main task is to meet the demands of the market. Production is allocated to optimal locations.

The second key sketch describes a society where environmental issues and sustainability are important. The individual is controlling its drive for material improvement and the 'growth' economy has been abandoned. Economy is determined by planning the rational use of resources. Agriculture has two functions: food production and land and water management, and will be paid for both activities.

The third sketch refers to a society with an inclination towards socialism, focusing on pleasure. In this society there is no distinction between work and leisure. Agriculture is important in providing leisure to the urbanised population and is recognised as a meaningful way of life. Economic justice is widespread with a minimum guaranteed income, limitation of consumption is encouraged and agricultural production is on a global scale, with focus on quality instead of quantity.

The fourth sketch is anti-capitalistic. In this society money is no longer the source of prestige and there is no private property. Agriculture is organised in cooperatives and there is a global agricultural policy that guides towards food production to meet national and international needs. Individuals are provided for according to their needs and contribute according to their capabilities. Environmental issues have priority.

In 1980 another scenario study for 2000 was carried out with the aim 'to establish feasible upper and lower bounds' for agricultural production in the EEC (Legg, 1980). In this study alternative high and low projections for agricultural production were carried out, and two scenarios were defined: one leading to high agricultural output, the other leading to low agricultural output. These two scenarios were also quantified, so that it could be compared with consumption projections. Since the consumption projections are depending on population growth and this was projected to be low, the main effects of the scenarios stem from differences in production rather than from the demand side.

Table A1.2	Review of Legg scenarios
Name	**Legg**
Theme	Agriculture
Time horizon	2000
Goals/aim	To establish feasible upper and lower bounds for agricultural; production
Drivers	
- Exogenous	Population growth, consumption changes (FAO)
- Endogenous	
Scenarios and their main characteristic	
Alternative 1	High agricultural output
Alternative 2	Low agricultural output
Methods	
Results/outline future of rural areas in the EU	CAP will be ever more costly and the pressure to reform agricultural policy will increase

Keeping the CAP will lead to increased costs for tax-payers and a low market accessibility for third countries. This will lead to pressure on the policy. Subsidies lead to lower levels of innovation in agriculture since it is possible to sell for intervention or for supported export. Consumers (e.g. manufacturers) will search for alternatives outside the policy regimes, third country producer will have incentives to develop new products to overcome the protection.

The number of people directly employed in agriculture will continue to decrease, more so in the low output scenario than in the high output scenario. Influence over policy ought to decrease as a response to this, as should the conflicting interests between different types of farmers and the conflicting interests of the food manufacturers. Since the CAP will be under pressure - not only because of the above mentioned reasons, but also because of conflicting interests between member states - and the EEC has a built-in bias to increase agricultural support it is likely that the variety of measures will increase.

Another pressure will come from third countries that are being disadvantaged by the high protection of the EEC markets. GATT should lead to liberalisations of trade and this pressure will increase as the market access decreases.

The studies clearly differ in their methods: the first study is narrative and pictures contrasting future worlds whereas the second study has storylines that are quantified. None of them show specific outcomes for rural areas, but the first gives possible futures for the role of agriculture in society, and therefore

also says something about life in rural areas or rather how life in rural areas will be perceived. The second study had a complete focus on the implications of the CAP. It is noteworthy that it does no talk about rural development policies at all; there were no rural policies in CAP in 1980 and apparently the author could not imagine it. The conclusion regarding a bigger variety of measures, however, goes in the same direction but does no specify rural policies.

So, were they right? It is hard to tell in the first study since it does not end with a single conclusion on how the future looks. Interesting in the Jansen and Faith study is that the participants were prone to keep socialism and anti-capitalistic systems, naturally unable to foresee the fall of the communist block in Central and Eastern Europe. As for the second study, the author did foresee some of the factors that would come to put pressure on the CAP, but was not able to predict the precise development CAP would go through.

Appendix 2
Tables

Table A2.1	ESPON: Image of the rural future in the Baseline Scenario
Name	**ESPON**
1. Name of the scenario	Baseline - trend scenario
2. Description of scenario	*Enlargement* Deepening and widening, western Balkans in 2020, Turkey in 2030. *Demography* Stable and ageing total population, increasing and controlled external migration, unchanged constraints on internal migration. *Economy* Slowly increasing activity rate, decreasing public expenditure, growing R&D budget. *Energy* Steady increase of energy prices, stable energy consumption, increasing use of renewables. *Transport* Continued traffic growth, constant investment in infrastructure, but below demand, partial application of the Kyoto protocol. *Rural development* Further liberalisation of international trade, progressive reduction of CAP budget, rapid industrialisation of agricultural production (including the production of biofuels), further diversification of functions of rural areas (stronger dependence upon the residential economy and new forms of tourism). *Socio-cultural factor* Heterogeneous and insufficient policies related to integration, growing ethnic, religious and social tensions. *Governance* Increasing cooperation between cross-border regions, increase in multi-level and cross-sectoral approaches, but limited to specific programs.

Table A2.1	ESPON: Image of the rural future in the Baseline Scenario (continued)
Name	**ESPON**
	Climate change Temperature rise of 1° and more frequent extreme events, mitigation measures based on new technologies, few adaptation measures.
3. Image of the rural future	*3a General* *Economy* Globalisation has a strong and accelerating influence on the process of creation and destruction of jobs. Metropolitan regions with advanced technologies tend to benefit, whereas regions with low or intermediate technologies tend to loose. Innovation gap between Europe and other advanced economies (US, Japan) remains significant. Breakthrough of knowledge economy in the field of biotechnology, nanotechnology, material technologies and ICT, largely concentrated in metropolitan areas. *Urban centre of Europe* The former pentagon (London-Paris-Milan-Munich-Hamburg) of the early 2000s, which groups the areas of concentration of flows and activities, has expanded along the main transport corridors, in the direction of Rome, Barcelona, Madrid, Glasgow, Copenhagen, Oslo, Stockholm, Berlin, Warsaw, Prague, Budapest and Vienna. Large cities in the periphery of Europe do not manage to catch up with global economic integration and advanced technologies and remain rather isolated in their economic development process. *Population and migration* Ageing of population is differentiated over regions (median age 45-50). Depopulation trends increasingly affect a number of remote rural regions. External (legal and illegal) migration pressure from the southern and eastern part of the Mediterranean and Africa will continue to increase. Access to employment is of key significance for social inclusion of these immigrants. Insufficient economic, social, educational and cultural integration has strengthened social and physical segregation in cites. In many cities and tourist resorts gated communities have emerged.

Table A2.1	ESPON: Image of the rural future in the Baseline Scenario (continued)
Name	**ESPON**
	Intensification of intra-European migration flows: urban-rural migration of self-employed and retirees; rural-urban migration from young employed and students. *New energy paradigm* High energy prices result in improvements in the efficiency of energy consumption, abandonment of energy-intensive manufacturing activities with low value added, and exploitation of renewable energy sources (solar, wind, biomass, tide and wave hydropower) leading to numerous new technologies, car sharing, increased use of public transport, and concentration of new settlements around public transport hubs. *Transport networks* The ongoing European integration and the recent EU enlargements generate increasing transit traffic. The development of high-speed train networks strengthens the relative accessibility of the regions serviced. Emergence of low-cost airlines boosts the development of regional airports, which improves the access to more peripheral and land-locked regions. Nevertheless, disparities in the accessibility between centre and periphery remain significant. *Climate change* Water shortage will become an increasingly serious problem in Southern Europe due to the increase in the drought trend for this area. This drought will significantly reduce the productivity of agriculture and will threaten tourist development. Winter sports activities are likely to decline in a number of mountain areas, including the Alps. Benefits from the progressive climate change refer to both new potentialities in agricultural production and winter tourism in mountain areas in northern Europe. *Environment* Agriculture remains a main polluter of ground water quality (nitrates, pesticides). Due to a tighter regulatory framework, the air quality throughout Europe improves, although this trend is offset by the continued growth of road traffic.

Table A2.1	ESPON: Image of the rural future in the Baseline Scenario (continued)
Name	**ESPON** *3b Sectoral employment and employment growth* Further decline of the share of agriculture in total employment. *3c Agriculture* The production of biomass and energy crops gave a new impetus to rural areas. Agriculture in polders and deltas is becoming increasingly industrialised. As a consequence, many elements of the natural landscapes are removed. In other areas close to consumption centres (agglomerations, tourist areas) and in large fertile areas (in the UK, France, Eastern Germany, North-west Poland, the Czech Republic, Slovakia, Hungary, Romania and Bulgaria), large-scale, highly mechanised agriculture employing very few people has been developed. On the other had, in less fertile or less favourably located areas, especially those dominated by small farms, a more diversified evolution has taken place. Some of them successfully transformed their profile towards rural tourism, handicrafts, organic farming, regional brands and energy crops, whereas in other LFA, especially in the periphery, farms were abandoned. Drought has led to agricultural abandonment in areas in Southern Europe where irrigation was no longer possible and where alternative agricultural production could not successfully be envisaged. *3d Landscape, nature and biodiversity* Natura 2000 covers most valuable natural areas; however, connectivity between those protected areas through ecological corridors is not fully reached. Many natural areas in new Member States are converted into farm land. Forest fires in Southern Europe have destroyed traditional landscapes.

Table A2.1	ESPON: Image of the rural future in the Baseline Scenario (continued)
Name	**ESPON**
	Biodiversity is threatened by the pressure of infrastructure development, tourism, especially in attractive coastal and mountain areas, holiday home developments, intensification of agriculture in polders and deltas, the abandonment of farms in less productive and dry rural areas, and environmental damage. *3e Rural Europe* Disparities among rural areas have been increased by 2030. Rural areas in the proximity of large cities and rural areas that are attractive for residential and tourist functions (coastal areas, attractive valleys, mountain areas, Mediterranean regions with a favourable climate) experienced population growth. A significant number of remote rural areas, especially in Northern, Central and Southern Europe, have more or less been abandoned. Various types of intermediate situations can, however, also be observed, with some regions taking advantage of CAP support to stabilise their economic performance.

Table A2.2	ESPON: Image of the rural future in the Competitiveness Oriented Scenario
Name	**ESPON**
1. Name of the scenario	Competitiveness-oriented
2. Description of scenario	*Enlargement* Priority given to enlargement Western Balkan and EFTA/EEA countries in 2015, Turkey in 2020. *Demography* Selective external in-migration, no constraints to internal migration, increase in retirement age, encouragement of fertility rate through fiscal incentives. *Economy* Strong reduction of EU budget, further liberalisation and privatisation of public services, strongly growing R&D budget. *Energy* Increasing energy consumption, realisation of TEN-E (Trans-European Energy Network) with investments in infrastructure according to market demand. *Transport* Realisation of TEN-T (Trans-European Transport Network) with investments in infrastructure according to market demand, priority given to links between metropolitan areas. *Rural development* Rapid and radical liberalisation of CAP (reduction of tariffs, budget and export subsidies), reduction of support to rural development policy, rapid industrialisation of agricultural production, strong dualisation of rural areas resulting from market forces. *Socio-cultural factor* Reactive management of social problems in large cities, increase in surveillance and security systems. *Governance* Abolishment of cross-border market barriers, less public intervention, wider application of the Open Method of Coordination.

Table A2.2	ESPON: Image of the rural future in the Competitiveness Oriented Scenario (continued)
Name	**ESPON**
	Climate change Increasing emission levels, mitigation measures based on flexible schemes, adaptation measures only where cost efficient.
3. Image of the rural future	*3a General* *Economy* All efforts are concentrated on the objective of increasing global competitiveness. Technological development is the cornerstone of the new policies, and budgets for other policies are severely cut. Europe gives up large segments of its economic structure with dwindling productivity. Energy supply diversification by means of new generations of nuclear power plants, renewable energy sources, coal gasification and hydrogen technology. Territorial disparities between metropolitan areas and other areas not catching up with high tech development increase. *Urban centre of Europe* The area of concentration of flows and activities covers only parts of the former pentagon (London-Paris-Milan-Munich-Hamburg), although it also extends along a few corridors to reach Vienna and Copenhagen and it includes major cities with a concentration of high tech employment in all Central European countries. *Population and migration* Population growth in metropolitan regions and large cities due to significant immigration flows and revival of fertility rates. Due to lack of integration policies, social unrests are more frequent than in the baseline scenario. As a reaction, gated communities are emerging in and around cities. Suburbanisation - because of metropolitan population growth, segregation and insecurity in cities - results in growing traffic, which increases pressure on the environment and natural areas.

Table A2.2	ESPON: Image of the rural future in the Competitiveness Oriented Scenario (continued)
Name	**ESPON**
	New energy paradigm The diversity of the energy supply systems, boosted by technological development, has mainly benefited the metropolitan regions. Due to insufficient financial resources, other regions remained more dependent on traditional fossil energy sources. Large energy companies buy or control wide fertile agricultural areas for the production of energy crops. *Transport networks* The focus of investments in roads and motorways is on connecting metropolitan regions. Border regions hardly benefit from improvements in transport networks. *Climate change* Measures to adapt its consequences are principally taken at international/global level. The situation described in the baseline scenario regarding desertification in Southern Europe, water conflicts, increased hazards in river valleys and coastal and arid regions applies to a greater extent in this scenario. *Environment* Environmental policy is not intended to slow down economic growth. Water shortages during dry summers in the pentagon and more serious drought in Southern Europe (abandonment and desertification). Consumer water prices have escalated. Growth of economic activities puts pressure on non-productive land use: natural areas near urban areas are transformed for urban development and coastal and mountain areas are further developed for tourism. Budget for management of Natura 2000 areas is too low. *3b Agriculture* Strong technological progress (biotechnology). Reduced employment in agriculture. Intensive cattle, cereals, crop and horticulture production increases in fertile regions. Subsistence farming in peripheral areas.

Table A2.2	ESPON: Image of the rural future in the Competitiveness Oriented Scenario (continued)
Name	**ESPON**
	3c Landscape, nature and biodiversity Intensive farming, accelerating urban sprawl, abandonment of less favoured areas and a more serious damage by natural hazards contribute to significantly reducing the attractiveness of landscapes. The creation of large wind energy parks by energy companies has a detrimental effect on the quality of natural and cultural landscapes. Net decline of biodiversity in Natura 2000 areas has been slowed down, but not stopped. *3d Rural Europe* Increase in disparities, with diverse developments: - Fertile rural areas with intensive agriculture, producing both food and energy products; - Less-favoured rural areas, where agriculture, and low-technology SMEs are fighting for survival and which progressively become abandoned by population and services; - Rural areas in the new Member States where large energy companies conclude long-term, but unfavourable contracts with farmers for the production of energy crops, thus increasing the external dependence of these areas while maintaining a low level of economic welfare; - Rural areas around metropolitan regions and large cities, where commuters and enterprises locate, diversify their economic base; - A number of attractive rural areas benefit from a residential and tourist economy.

Table A2.3	ESPON: Image of the rural future in the Cohesion Oriented Scenario
Name	**ESPON**
1. Name of the scenario	Cohesion-oriented
2. Description of scenario	*Enlargement* Priority given to deepening, brake on further enlargement. *Demography* Restrictive external in-migration, more flexible retirement ages, encouragement of fertility rates by more flexible arrangements for child-care. *Economy* Maintaining EU budget, reinforcement of structural funds and concentration on weakest regions. *Energy* Realisation of TEN-E, promotion of decentralised energy production, particularly renewables. *Transport* Development of TEN-T, priority given to peripheral regions, support to transport services in rural and less developed areas. *Rural development* Minor CAP reforms, but shift from pillar 1 to pillar 2, priority given to Direct Payments from pillar 1 in less developed rural regions, priority given to environmental and animal health criteria, promotion of quality products, active policy for economic diversification in rural areas, including SMEs, tourism and residential functions. *Socio-cultural factor* Promotion of regional and European identities, integration of marginal groups in peripheral areas, pro-active socio-cultural integration policies, especially in the cities, increased fiscal and/or societal investments in quality of life issues, like health, personal care and local environment. *Governance* Active multi-level territorial governance in areas supported by structural funds, more public intervention. *Climate change* Constant emission levels, strict mitigation measures, wide range of adaptation measures.

Table A2.3	ESPON: Image of the rural future in the Cohesion Oriented Scenario (continued)
Name	**ESPON**
3. Image of the rural future	*3a General* *Economy* Enhancing the vitality of less favoured regions is a main objective, as the economic and social costs of de-vitalised regions are perceived as extremely high in the long run. In case of incompatibilities between cohesion and competitiveness, priority will be given to (economic, social and territorial) cohesion. Support for technological development is concentrated on less-favoured regions. Lower GDP growth compared with the baseline scenario: the winning regions are the non-metropolitan areas, whereas growth in metropolitan areas slowed down. *Urban centre of Europe* The former pentagon (London-Paris-Milan-Munich-Hamburg) of the early 2000s, which groups the areas of concentration of flows and activities, has expanded to a larger extent than in the baseline scenario, and includes a larger number of cities in the periphery of Europe. *Population and migration* Population growth in many areas, due to a new up-turn in birth rates (amplified by family policy), economic growth in peripheral regions and strictly regulated and targeted migration strategies. Ethnic minorities and other less privileged groups have become better integrated in the labour market. This contributed to reducing social and physical segregation in cities and gated communities did not emerge. *New energy paradigm* Energy saving measures. Obsolete energy systems in less developed regions are modernised. No new breakthrough in energy technology. Europe becomes increasingly competitive in sectors related to renewable energy technologies; hence dependency on external energy supply decreases. *Transport networks* A main priority is the development of an efficient transport infrastructure on the major corridors in the new Member States and between the new Member States and the EU15. In addition, support is also given to strategic regional transport axes, in order to connect medium-sized and small towns. Efficient railway and waterway networks are stimulated.

Table A2.3	ESPON: Image of the rural future in the Cohesion Oriented Scenario (continued)
Name	**ESPON**
	Climate change The negative impact of climate change on rural regions in Southern Europe has been less strong than in the trend scenario due to support for adaptation measures. *Environment* Environment is one of the pillars of European solidarity. Promotion of environmentally friendly practices for industry and transport. Level of water stress is lower than in the baseline scenario, due to a strict implementation of the Water Directive and targeted use of funds to build and maintain a sustainable water management system. Investments in water saving irrigation techniques in Southern Europe, cultivation of less-water demanding crops, policies concentrate on halting nitrate diffusion and measures to prevent flooding of rivers. *3b Agriculture* Production of bio-energy crops has helped to counterbalance the decline of a number of traditional weakly competitive agricultural activities. Large-scale agriculture increases most in rural areas with low land prices in Poland and the Baltic States. In the fertile areas of France, Germany and Poland, agricultural production further modernises and food production competes here strongly with the production of energy crops. Many intensive cattle farms and horticulture settle in agro-production parks. This clustering reduces production costs and provides possibilities for recycling manure, waste, et cetera. Technological progress focused on new techniques including water-saving irrigation techniques which reduce the drought-threat in southern Europe. *3c Landscape, nature and biodiversity* Rural development policies favour the maintenance of natural and cultural heritage. Efforts are made to prevent forest fires in Southern Europe by better forest management.

Table A2.3	ESPON: Image of the rural future in the Cohesion Oriented Scenario (continued)
Name	**ESPON**
	3d Rural Europe Structural funds together with strong rural development policies lead to a high degree of economic diversification. The dichotomy between strongly performing rural areas located in and around metropolitan regions and the more remote and declining rural regions has been more modest, as this last group was strongly supported. Nevertheless, a number of remote rural regions continue to face decline and depopulation.

Table A2.4	ESPON: Proactive/Roll-back scenario: the chosen path
Name	**ESPON**
1. Name of the scenario	Proactive/roll back scenario: the chosen path
2. Description of scenario	*Enlargement* It is not specified whether there is a further enlargement of the EU. *Demography* Ageing of society caused less problems through the increase in productivity and child friendly policies. In addition short-term labour deficits were handled through increased immigration (active quota-based system) and higher internal mobility. *Economy* Strong productivity growth through strong focus on education and innovation. R&D focuses on several lines of research where Europe can find highest added value and gain niche positions. The process of enterprise creation was harmonised and access to capital was supported. *Energy* Share of renewables has increased, technological innovations give new sources. High energy prices. *Transport* Tax and pricing system encourages public transport and decreases road transport for private and business use. *Rural development* Several CAP reforms including implementations of WTO agreements. Territorial different approaches (bottom-up) based on functional types of regions. *Socio-cultural factor* Important investments in education, targeted language education, proactive employment policies. Social housing and land interventions to reduce social disparities.

Table A2.4	ESPON: Proactive/Roll-back scenario: the chosen path (continued)
Name	**ESPON**
	Governance New policy goals were embedded into extended criteria (Maastricht + % of GDP spent on education and R&D), compulsory elements were included, but some level of flexibility was kept to enable local (or national) priorities. Regional policies designed through bottom-up approach and more fiscal autonomy allow for regional differences and tailor-made policies. Strong reduction in classical budget lines such as CAP. Sustainable development (all three pillars) focus on urban policy. *Climate change* Environmental catastrophes (2012) lead to inclusion of environmental goals in several policy fields. Investment in R&D for new energy sources.
3. Image of the rural future	*3a General* *Economy* Knowledge based and highly innovative at the expense of manufacturing, low-level service in finance and insurance, and subsidised agricultural activities. Main investments are in increased productivity such as technology and training. A large number of (flexible) service and technology enterprises are competing on the world market - location is driven by knowledge centres. *Urban centre of Europe* Prosperity and growth are not limited to the large metropolitan areas, instead also other areas contribute to the international competitiveness of the European economy. The pentagon extended and through reinforced territorial cooperation between macro-regions other strong clusters have evolved: 'Baltic Sea region', 'Eastern square', South-East (Istanbul, Athens, Bucharest Sofia), 'Latin Arch', South-West Europe. *Population and migration* The population is older than in early 2000s with some really 'old' regions that show lower population densities and reorientation towards residential economies. Population numbers has been stabilised through immigration and increased fertility rates. Old industrial areas have lower populations; others have managed to adapt the production to a high-tech industry.

Table A2.4	ESPON: Proactive/Roll-back scenario: the chosen path (continued)
Name	**ESPON**
	Some areas have diversified their economy and areas close to metropolitan centres have turned into residential areas with commuting facilities. *New energy paradigm* The share of renewable energy sources in energy consumption has increased significantly and a large part of the production has been decentralised to individual homes or small settlements areas. A significant part of the mass energy comes from large plants, but new technologies (hydrogen production, gasification of coal) have limited the expansion of nuclear energy. *Transport networks* There is an extensive network of high-speed public transport both in metropolitan and rural areas. A combination of pricing and taxation systems has built barriers to car usage. Freight traffic has also changed and the inland waterways have increased in importance, most trucks are used for local distribution. *Climate change* Systematic prevention and mitigation has contained the damages of natural hazards. Still, specific areas have been hard hit occasionally. Structural impacts of climate change are especially strong in southern Europe (agricultural production) and mountainous areas (less snow, land slide risk) where adjustments have been necessary in economic bases and production structures, in energy and water supply systems and in settlements. *Environment* Urban areas have improved the noise levels and the air quality, decrease in energy use (high prices and taxes), very ambitious CO_2 programmes as of 2015.

Table A2.4	ESPON: Proactive/Roll-back scenario: the chosen path (continued)
Name	**ESPON**
	3b Agriculture In some areas there has been an increase in small scale subsistence farming and a high-level of energy-autonomy (these areas show lower growth rates). In southern Europe water intensive crops (maize and vegetables) have been replaced by water-saving crops (sunflowers). Competitive farms in main consumption areas remain strong without price support and despite strict regulations regarding animal health, animal welfare and environmental protection. The location of the food production is concentrated on areas surrounding large urban agglomerations to decrease transport and there has been an increase in demand for organic products. *3c Landscape, nature and biodiversity* In some areas the decrease in population has left more land available for nature. Landscapes are more diversified than in the beginning of the 2000s. Natural areas in coastal regions are protected through limitation of urban sprawl in the proximity of existing towns and nuclei. Investments in large-scale recreation areas in the proximity of large cities helped to contain the urban sprawl. *3d Rural Europe* Strong dynamics in rural areas were caused by changes in policies and strong development of biomass and energy crops. Rural areas in southern Europe are experiencing difficulties due to climate change whereas northern rural areas experience an advantageous development. By 2030 rural areas are more diversified. More distant from metropolitan regions, medium-sized cities have played an important role for services and employment. Remote rural areas without larger cities continue to decline; an active policy made this shrinking 'intelligent' through active spatial planning. Innovative approaches to services keep accessibility also high in marginal areas (mobile health care, mobile libraries).

Table A2.5	EURURALIS: Image of the rural future in the Global Economy Scenario
Name	**EURURALIS**
1. Name of the scenario	Global Economy
2. Description of scenario	*General* *EU enlargement and trade arrangements* Turkey EU member in 2020, tariff elimination former Soviet Union in 2020. Export subsidies and import tariffs: 25% reduction of in 2010, 50% reduction in 2020 and abolished in 2030. *Agricultural policies* Intervention prices: at MTR level in 2010, intervention prices just below WMP in 2020, abolished in 2030. Quotas for milk and sugar: as decided in MTR reform in 2010, abolished in 2020. Decoupled payments: implementation of MTR reform in 2010; coupled payments are included in decoupled payments in 2010; reduction of decoupled payments with 50% in 2020. Second Pillar Funds maintained as in MTR. Set aside for bio-fuel: 5% in 2010, 15% in 2020 and 20% in 2030. *Demography* Based on high variant of EUROSTAT projections with population increase in densely populated areas and decrease in sparsely populated areas. *Macro-economic growth* Based on data from CPB (Centraal Planbureau The Netherlands). *Agro-technology* Productivity increase with 5% in 2010, 2020 and 2030 compared to FAO projections. *Consumer behaviour* No specific arrangements. *EU and national policies* Some changes allowed in NATURA2000, some incentives to prevent fragmentation, no LFA policy, some shift allowed in land policies with dynamic allocation possible, high pressure on land in densely populated areas (hobby farming, recreation), no specific bio-energy consumption policy, loose environmental legislation, no restrictions on land conversion.

Table A2.5	EURURALIS: Image of the rural future in the Global Economy Scenario (continued)
Name	**EURURALIS**
3. Image of the rural future	*3a Sectoral employment and employment growth* *EU15* Total employment increases between 2001 and 2030 with a bit more than 5%. Employment in agriculture decreases with more than 25%, with the strongest decrease in the livestock sector of almost 30%. *NEU12* Total employment increases with less than 5%. Employment in agriculture decreases with almost 25% with the strongest reduction in processing at a bit more than 25%. Regional income disparities persist. *3b Agriculture* Livestock numbers decreases, and the production remains concentrated. For the NEU12 there is an increase in livestock demand. Crop production growth is low, sugar production will decline substantially. *3c Landscape, nature and biodiversity* Landscape will change due to urbanisation and abandonment of agricultural land, which will lead to human use in densely populated areas and to nature development in less populated areas. Soil erosion will decrease with 28% (EU15), 48% (NEU10) and 33% (Bulgaria and Romania). Carbon sequestration will decrease for EU15 up to 2010, thereafter it increases. In NEU12 carbon sequestration will decrease up to 2010. The biodiversity index increases from 36 to 38 between 2000 and 2030. Agricultural production is maintained, but on a smaller area of agricultural land. Land abandonment in marginal regions in the EU15; as a result traditional farmland landscapes disappear. *3d Other* Yearly growth of GDP is a bit more than 2% in EU15 and a bit more than 3% in NEU10. Territorial disparities; in particular, rural regions in the NEU12 lag behind as the exodus of agricultural labour cannot be absorbed by the other sectors of the economy.

Table A2.6	EURURALIS: Image of the rural future in the Continental Market Scenario
Name	**EURURALIS**
1. Name of the scenario	Continental market
2. Description of scenario	*General* *EU enlargement and trade arrangements* Customs union with Turkey in 2010, tariff elimination with USA in 2020. *Agricultural policies* Intervention prices: as MTR. Quotas for milk and sugar at MTR level to safeguard self-sufficiency. Coupled and decoupled payments maintained as in MTR. Second Pillar Funds maintained as in MTR. Set aside for biofuel; 5% (2010), 15% (2020) and 20% (2030). *Demography* Based on base variant of EUROSTAT projections, increase in densely and intermediately populated areas, decrease in sparsely populated areas. *Macro-economic growth* Based on data from CPB (Centraal Planbureau The Netherlands). *Agro-technology* Slower growth of productivity growth compared to FAO projections: -5% for EU. *Consumer behaviour* Preference for products from own region: +1% in 2010, + 2% in 2020 and +2% in 2030. *EU and national policies* NATURA2000 contains agricultural land restrictions but the land may be abandoned, LFA remains at current levels, some shifts in land policies are allowed, dynamic allocation possible, high pressure on land in densely populated areas (hobby farming, recreation), imports of biofuel only allowed from US and other transatlantic partners, no restrictions on land conversion.

Table A2.6	EURURALIS: Image of the rural future in the Continental Market Scenario (continued)
Name	**EURURALIS**
3. Image of the rural future	*3a Sectoral employment and employment growth* *EU15* No data reported for total employment. Total agricultural employment decreases with almost 25% and the strongest decline is in processing with almost 30%. *NEU12* Total employment decreases with over 10% and agricultural employment with a bit more than 25%. The strongest decline within agricultural sectors is in processing with over 30%. Regional income disparities persist. *3b Agriculture* Livestock number decreases over time; in the EU15 this effect is more pronounced in land-demanding livestock. In the NEU12 there is an increase expected for cattle and poultry, but this will not transfer to the total livestock numbers that still show a decrease. Crop production is low due to low demographic and economic growth and low demand for meat gives low demand for fodder crops. *3c Landscape, nature and biodiversity* Strong economic growth will lead to an increase in the built-up area and the protection of agriculture will lead to a high demand for agricultural land. Both these factors will exert pressure on natural areas and valuable landscapes might be lost. Soil erosion will decrease with between 13% in EU15 and 26% in NEU10, in Romania and Bulgaria soil erosion will decrease with 26%. Carbon sequestration will decrease dramatically in EU15 due to an increase in arable land, in NEU12 agricultural land will decrease and therefore the sequestration will increase. The biodiversity index slightly decreases from 36 to 35 between 2000 and 2030. Agricultural production is maintained, but on a smaller area of agricultural land. Land abandonment in marginal regions in the EU15; as a result traditional farmland landscapes disappear.

Table A2.6	EURURALIS: Image of the rural future in the Continental Market Scenario (continued)
Name	**EURURALIS**
	3d Other Yearly growth of GDP is almost 2% in EU15 and about 2.5% in NEU10. Territorial disparities; in particular, rural regions in the NEU12 lag behind as the exodus of agricultural labour cannot be absorbed by the other sectors of the economy.

Table A2.7	EURURALIS: Image of the rural future in the Global Cooperation Scenario
Name	**EURURALIS**
1. Name of the scenario	Global cooperation
2. Description of scenario	*General* *EU enlargement and trade arrangements* Turkey enters EU in 2010, tariff elimination with FSU in 2010. Export subsidies and import tariffs: 25% reduction in 2010, 50% reduction in 2020 and abolishment in 2030. *Agricultural policies* Intervention prices: at MTR level in 2010, intervention prices just below WMP in 2020, abolished in 2030. Quotas for milk and sugar: as decided in MTR reform in 2010, abolished in 2020. Decoupled payments: implementation of MTR reform in 2010; coupled payments are included in decoupled payments in 2010; reduction of decoupled payments with 25% in 2020 and with 50% in 2030. Second Pillar Funds maintained as in MTR. Set aside for bio-fuel: 5% in 2010, 15% in 2020 and 20% in 2030. *Demography* Based on high variant of EUROSTAT projections, increase in population in densely and intermediately populated areas, decrease in sparsely populated areas. *Macro-economic growth* Based on data from CPB (Centraal Planbureau The Netherlands). *Agro-technology* No effects on productivity growth compared to FAO projections. *Consumer behaviour* Decrease over time in the consumption of animal protein from meat (-5% in 2020 and -10% in 2030).

Table A2.7	EURURALIS: Image of the rural future in the Global Cooperation Scenario (continued)
Name	**EURURALIS**
	EU and national policies Restrictions in NATURA2000 changes, incentives to limit fragmentation, incentives to prevent abandonment of agriculture in NATURA2000, strong protection of local patches, LFA policy maintained, restrictions on shifts in land use under land policy, moderate pressure on nature in urban areas, erosion policy implemented, proportion of 52 Mton bio-energy in energy consumption from 2010 on, proportion of 5.75% of transport fuels for consumption from 2010 on, strong environmental legislation, restrictions in land conversion.
3. Image of the rural future	*3a Sectoral employment and employment growth* *EU15* Total employment increases with a bit more than 5%. Employment in agriculture decreases with a bit more than 15%, with the strongest decline in the livestock sector with more than 25% reduction. *NEU12* Total employment increases slightly by about 1%. Employment in agriculture decreases with over 20%, the strongest decline is in processing with about 25%. Regional income disparities persist. *3b Agriculture* Livestock number decreases over time; in the EU15 this effect is more pronounced in land-demanding livestock. In the NEU12 there is an increase expected for cattle and poultry numbers. Crop production growth is low in EU27.

Table A2.7	EURURALIS: Image of the rural future in the Global Cooperation Scenario (continued)
Name	**EURURALIS**
	3c Landscape, nature and biodiversity Landscape will be shaped by the concentrated urbanisation and the enhancement of the NATURA2000. There will be a smaller N surplus for EU15 and bigger N surplus for NEU12. Soil erosion will decrease with 30% in EU15, 26% in NEU10 and 33% in Bulgaria and Romania. Carbon sequestration will increase in both EU15 and in NEU12 (even more than in GE scenario). The biodiversity index increases from 36 to 39 between 2000 and 2030. Agricultural production is maintained, but on a smaller area of agricultural land. Land abandonment in marginal regions in the EU15; as a result traditional farmland landscapes disappear. *3d Other* Yearly growth of GDP is a bit more than 1% in EU15 and 3% in NEU10. Territorial disparities; in particular, rural regions in the NEU12 lag behind as the exodus of agricultural labour cannot be absorbed by the other sectors of the economy.

Table A2.8	EURURALIS: Image of the rural future in the Regional Communities Scenario
Name	**EURURALS**
1. Name of the scenario	Regional communities
2. Description of scenario	*General* *EU enlargement and trade arrangements* Customs union with Turkey in 2010, 25% reduction of export subsidies in 2010 and abolishment in 2020, no change in import tariff, increase in non-tariff barriers (+3% in 2010, +3% in 2020 and +4% in 2030). *Agricultural policies* Intervention prices: maintained at MTR level in 2010, 5% increase in 2020 and 5% increase in 2030. Quotas for milk at MTR level in 2010 and at level to safeguard self-sufficiency in 2020. Quotas for sugar at MTR level in 2010. Decoupled payments maintained as in MTR. Coupled payments maintained as in MTR in 2010, further modulation of 10% in 2020 and 10% in 2030. Second Pillar Funds maintained as in MTR. Set aside for biofuel; 5% (2010), 15% (2020) and 20% (2030). *Demography* Low variant of EUROSTAT projections. *Macro-economic growth* Based on data from CPB (Centraal Planbureau The Netherlands). *Agro-technology* Reduction of productivity of 5% compared to FAO projections in 2010, 2020 and 2030. *Consumer behaviour* Increased demand for regional products: 1% shift (2010), additional 2% shift (2020 and 2030), decreased consumption of animal protein from meat over time (-5% in 2020 and -10% in 2030).

Table A2.8	EURURALIS: Image of the rural future in the Regional Communities Scenario (continued)
Name	**EURURALS**
	EU and national policies NATURA2000 restrictions, incentives to limit fragmentation, incentives to prevent abandonment of agriculture in NATURA2000, very strong protection of local patches, LFA policy maintained, incentives to prevent shifts under land policies, low pressure in densely populated areas, erosion policy, proportion of 52 Mton bio-energy in energy consumption from 2010 on, proportion of 5.75% of transport fuels for consumption from 2010 on, 100% import restriction, very strong environmental legislation, restrictions on land conversion.
3. Image of the rural future	*3a Sectoral employment and employment growth* *EU15* Total employment decreases with less than 5%. Employment in agriculture decreases with 15% with the strongest decline in livestock at over 20%. *NEU12* Total employment decreases with over 10%. Employment in agriculture decreases with 20% and the strongest decline is in processing. Regional income disparities persist. *3b Agriculture* Livestock number decreases over time, in the EU15 this effect is more pronounced in land-demanding livestock. In the NEU12 there is an increase expected for cattle and poultry numbers. Crop production growth is low in EU27. *3c Landscape, nature and biodiversity* Small changes in landscape spread over all land uses. There will be a smaller N surplus for EU15 and bigger N surplus for NEU12. Soil erosion will decrease with 30% in EU15, 26% in NEU10 and 33% in Bulgaria and Romania. Initially carbon sequestration will decrease, but due to land abandonment it will eventually increase. The biodiversity index increases from 36 to 37 between 2000 and 2030.

Table A2.8	EURURALIS: Image of the rural future in the Regional Communities Scenario (continued)
Name	**EURURALS**
	Agricultural production is maintained, but on a smaller area of agricultural land. Land abandonment in marginal regions in the EU15; as a result traditional farmland landscapes disappear. *3d* Other Yearly growth of GDP is less than 1% in EU15 and about 1.5% in NEU10. Territorial disparities; in particular, rural regions in the NEU12 lag behind as the exodus of agricultural labour cannot be absorbed by the other sectors of the economy.

Table A2.9	Scenar 2020: Image of the rural future in the Baseline Scenario
Name	**SCENAR 2020**
1. Name of the scenario	Baseline
2. Description of scenario	*Exogenous drivers* *Demographics* Major population trends as observed in the past. The built-up area increases in all countries in all scenarios in the same degree. *Macroeconomic growth* Moderate growth as seen in the trends, increasing trend for labour market liberalisations. *Consumer preferences* More demand for value added, increased spending per capita, consumption of organic and regional foods as in the past. *Agritechnology* Continues trends in cost-saving technical progress, biotech, GMO. *World markets* Trends in agri-markets as in OECD/FAPRI studies adjusted for differences in the four previous exogenous drivers. *Policy-related drivers* *CAP* Balanced markets (keeping public stocks at 1-2% of domestic consumption), financial discipline and 25% modulation of direct payments, taking account of the budget according to the financial perspectives for 2007-2013 for rural development policies of the Second Pillar. *Biofuels* Continuation of EU Biofuels Strategy. *Enlargement* EU25 plus accession of Bulgaria, Romania, Turkey and the Western Balkans. *WTO and other international agreements* EU offer 2005 in Doha Round. *Environmental policies impact on agriculture* Continuation of existing environmental legislation.

Table A2.9	Scenar 2020: Image of the rural future in the Baseline Scenario (continued)
Name	**SCENAR 2020**
3. Image of the rural future	*3a Sectoral employment and employment growth* The share of agriculture and food processing in the economy decreases. The sectoral employment in agriculture and industry decreases for the EU15 as well as for NEU10. Employment in services increases. Sectoral structure of the economy: decreased importance of agriculture and food processing compared to base year (2005). *3b Agriculture* Annual growth in crop and livestock production of about 0.75% in the EU25. The cereals and oilseed area decreases between 2005 and 2020, and the production increases. The production of energy crops almost doubles. Production of beef decreases, poultry meat production increases. Cheese production increases slightly. The number of farms decreases by about 25%. *3c Landscape, nature and biodiversity* In the EU25, 5% of the area faces a change in land use. Agricultural production in 2020 needs 91% of the agricultural land used in 2000/2002; biofuel need 4% additional agricultural area in 2020. Relatively high land use change in Italy, Portugal, Bulgaria, Romania, Poland and Denmark. Some land abandonment in marginal agricultural areas, especially in Scandinavia; however, this tendency is dampened by LFA policy. *3d Other* In the EU15, the sector income for both crops and livestock decreases with about 7%. In the NEU10, the sector income for crop increases and the sector income for livestock decreases. Territorial disparities persist; lagging regions are especially located in Central Europe and rural parts in Denmark, Sweden, Finland, Germany and France.

Table A2.10	SCENAR 2020: Image of the rural future in the Regionalisation Scenario
Name	**SCENAR 2020**
1. Name of the scenario	Regionalisation
2. Description of scenario	*Exogenous drivers* Similar to the baseline scenario. *Policy-related drivers* *CAP* Existing market policies, financial discipline and 5% modulation of direct payments, significant increase in funding of rural development through all EAFRD axes. *Biofuels* Higher policy support to produce biofuels. *Enlargement* Similar to the baseline scenario. *WTO and other international agreements* No WTO agreement/bilateral approach. *Environmental policies impact on agriculture* Reinforcement of environmental legislation.
3. Image of the rural future	*3a Sectoral employment and employment growth* The share of agriculture and food processing in the economy decreases. The sectoral employment in agriculture and industry decreases for the EU15 as well as for the NEU10. Employment in services increases. *3b Agriculture* Annual growth in crop production of about 1% and in livestock production about 0.75% in the EU25. The cereals and oilseed area decreases between 2005 and 2020, and the production increases. The production of energy crops doubles. Production of beef decreases slightly, whereas poultry meat production increases. Cheese production increases as well. The number of farms decreases by about 29%.

Table A2.10	SCENAR 2020: Image of the rural future in the Regionalisation Scenario (continued)
Name	**SCENAR 2020**
	3c Landscape, nature and biodiversity In the EU25, 4.3% of the area faces a change in land use. Agricultural production in 2020 needs 96% of the agricultural land used in 2000/2002; biofuel need 4% additional agricultural area in 2020. Relatively high land use change in Italy, Portugal, Bulgaria, Romania, Poland and Denmark. Some land abandonment in marginal agricultural areas, especially in Scandinavia and South-Eastern France; however, this tendency is dampened by LFA policy. Changes in nutrient surpluses are small compared to baseline. *3d Other* In the EU15, the sector income for both crops and livestock decreases with 5-6%. In the NEU10, the sector income for crop and livestock increases. Territorial disparities persist; lagging regions are especially located in Central Europe and rural parts in Denmark, Sweden, Finland, Germany and France.

Table A2.11	SCENAR 2020: Image of the rural future in the Liberalisation Scenario
Name	**SCENAR 2020**
1. Name of the scenario	Liberalisation
2. Description of scenario	*Exogenous drivers* Similar to the baseline scenario *Policy-related drivers* *CAP* No internal support policies for markets, removal of direct income payments, decreased funding for rural development policies of the second pillar of the CAP. *Biofuels* No per hectare subsidy for biofuels. *Enlargement* Similar to the baseline scenario. *WTO and other international agreements* Removing import tariffs. *Environmental policies impact on agriculture* Partial withdrawal of environmental legislation.
3. Image of the rural future	*3a Sectoral employment and employment growth* The share of agriculture and food processing in the economy decreases. The sectoral employment in agriculture and industry decreases for the EU15 as well as for the NEU10. Employment in services increases. *3b Agriculture* Annual growth in crop production of about 0.6% and in livestock production about 0.7% in EU25. The cereals area is almost unchanged and the oilseed area decreases between 2005 and 2020. The production of both increases. The production of energy crops almost doubles. Production of beef decreases to almost half of the base year, poultry meat production also shows a sharp decline. Cheese production increases. The number of farms sharply decreases by about 47%.

Table A2.11	SCENAR 2020: Image of the rural future in the Liberalisation Scenario (continued)
Name	**SCENAR 2020**
	3c Landscape, nature and biodiversity In the EU25, 9.2% of the area faces a change in land use. Agricultural production in 2020 needs 86% of the agricultural land used in 2000/2002; biofuel need 4% additional agricultural area in 2020. Relatively high land use change in Italy, Portugal, France, Germany, Spain, the UK, Poland and Denmark. Strongest land abandonment effect of all scenarios, especially in Scandinavia, Southern France, Scotland, Germany, Spain and Italy, as there is no LFA to protect the marginal areas. Changes in nutrient surpluses are small compared to the baseline scenario, but more regions experience a decrease than in the regionalisation scenario. *3d Other* In the EU15, the sector income for both crops and livestock decreases with over 20% and 14% respectively. In the NEU10, the sector income for crop and livestock decreases by 4% and about 7% respectively. Territorial disparities persist; lagging regions are especially located in Central Europe and rural parts in Denmark, Sweden, Finland, Germany and France.

Table A2.12	PRELUDE: Image of the rural future in the Great Escape Scenario
Name	**PRELUDE**
1. Name of the scenario	Great escape - Europe of contrast
2. Description of scenario	*Key developments* - Increased importance of international trade (economic globalisation). - Strong reduction in policy interventions. - Decreasing societal solidarity. - Societal tension builds up as the impoverished and poor immigrants move to urban city centres. - People who can afford leave major cities and settle in rural areas; the wealthiest of them settle in so-called gated communities. After 2015 more and more disadvantaged members of society move to rural areas and settle outside the gated communities. They provide basic services, private health, education, leisure and security to people living in the gated communities.
3. Image of the rural future	*3 a General economy* The economy flourishes, with a high level of technological innovation. Conditions for immigration are eased in order to fill the gaps in the labour force. Social inequalities rise, especially in urban areas. Overall economic growth amounts to 2.8% per year, but with a distinct split between urban areas (2.3%) and rural areas (2.9%). This split increases the separation between affluent communities in rural areas and the poor living in urban centres. *3b Agriculture* Due to further liberalisation of agricultural markets and reduction of support schemes, agriculture intensifies, becomes high-tech and concentrates in areas that are optimal for production. Small extensive farms disappear. Due to the low environmental awareness and the limited diversification of energy sources, demand for biofuels does not strongly increase.

Table A2.12	PRELUDE: Image of the rural future in the Great Escape Scenario (continued)
Name	**PRELUDE**
	3c Landscape, nature and biodiversity Profound landscape changes take place in this scenario: cropland decreases by 37% and grassland by 35%. In the Mediterranean, Eastern Europe, South-Western France, the Massif Central, Central Spain, the Netherlands and Norway, however, the decrease in agricultural land is even more than 50%. This affects biodiversity. Nature conservation legislation is weakened, leading to a reduction in the number of protected sites (1.6% p.a.). *3d Other* Extension of settlement area by 3%. The largest urbanisation will be in areas where in 2005 less than 5% of the land is urban.

Table A2.13	PRELUDE: Image of the rural future in the Evolved Society Scenario
Name	**PRELUDE**
1. Name of the scenario	Evolved society - Europe of harmony
2. Description of scenario	*Key developments* - Intensified flooding that cumulate into several weeks of heavy flooding, leaving hundreds of thousands of people in Europe without a home. - A subsequent international energy crisis after a series of terrorist attacks on oil pipelines causing oil prices to sky-rocket. The running out of reserves in many countries makes the search for new ways of producing energy inevitable. - Life-style changes: a trend away from the 'rat-race' lifestyle in cities in Western European to a more pastoral living in rural areas, especially in Eastern Europe. - Ambitious European and national policies in favour of environmentally sustainable regional development.
3. Image of the rural future	*3a General (economy)* Due to the revival of the countryside, high transportation costs and the advancement of new technologies, many people work and live in semi-rural, non-flooding areas without travelling too much. Overall economic growth is moderate at 1.5% p.a. (current level) and population growth is also similar to current growth rate (0.12% p.a.). *3b Agriculture* Farming is high-tech and increasingly organic. Farming intensity decreases. Large scale farming of low intensity in Eastern Europe. Renewable energies are strongly promoted; the area for biofuel production increases by 0.3% p.a.

Table A2.13	PRELUDE: Image of the rural future in the Evolved Society Scenario (continued)
Name	**PRELUDE**
	3c Landscape, nature and biodiversity Agricultural area remains approximately the same. Only in areas that are prone to repeated flooding, such as South-Western France, western parts of Portugal and some alpine regions, cropland is reduced considerably. Overall, changes in land use are not dramatic, and extensive farmland with high nature value is relatively well conserved. Increase in settlement areas in Eastern Europe result in an increase in demand for land for infrastructure in Eastern Europe, with likely negative impacts on the landscape. *3d Other* Net migration from the most densely populated urban areas towards peripheral regions, in particular, from west to east. As a result, urban population decreases by 0.7% p.a. and rural population increases by the same rate. Overall increase in the settlement area in Europe of 3%.

Table A2.14	PRELUDE: Image of the rural future in the Clustered Networks Scenario
Name	**PRELUDE**
1. Name of the scenario	Clustered networks - Europe of structure
2. Description of scenario	*Key developments* - Globalisation propels economic growth. - Environmental awareness increases as urban air pollution intensifies. Migration away from polluted urban areas is encouraged. - Strong coherent spatial planning policies: 14 new medium-sized cities of 250,000 inh. outside the main urban centre in Europe (the 'blue kangeroo') are created. Smaller settlements are created as well in peri-urban areas. Belts of protected cultural landscapes are created in urban areas, serving both recreational and high quality food production purposes. - Ageing of population.
3. Image of the rural future	*3a General (economy)* The new cities generate major local changes in infrastructure, new employment opportunities and activities in peripheral regions. Due to the migration of 3.5 million people out of the 'blue kangeroo', income in the centre of Europe declines at the benefit of the periphery. The overall economic growth is 3.5% p.a. Growth in urban areas (3.7% p.a.) exceeds that in rural areas (3.1% p.a.). *3b Agriculture* Deepened international trade relations leads to marginalisation of agriculture. Net agricultural production is reduced in Europe and imports increase. Agriculture continues and intensifies production only in the most favourable areas. These farms are internationally competitive. Biofuels are partly subsidised.

Table A2.14	PRELUDE: Image of the rural future in the Clustered Networks Scenario (continued)
Name	**PRELUDE**
	3c Landscape, nature and biodiversity Because of large scale land abandonment, the amount of crop land (-35%) and grassland (-33%) strongly decreases, especially in the Mediterranean and eastern countries. Natural habitats develop, but to the detriment of high nature value farmland. Biodiversity and the quality of water, soil and air benefit from receding agriculture and the creation of greenbelts in urban areas. *3d Other* Rural economies are under pressure; agriculture loses much of its attractiveness for younger people. There is an outflow of high educated people to the urban areas and less skilled and older people stay in rural areas.

Table A2.15	PRELUDE: Image of the rural future in the Lettuce Surprise U Scenario
Name	**PRELUDE**
1. Name of the scenario	Lettuce Surprise U - Europe of innovation
2. Description of scenario	*Key developments* - A major food security crisis hits Europe in 2015. As crisis management fails, faith in central government and in the safety of Europe's food supply decreases strongly. An alternative food production and control regime as well as regional self-sufficiency with regard to food and energy are strived for. - Political decentralisation becomes prominent. New communication technologies facilitate local participatory decision-making and open-source development of innovative technologies. - Focus is on enhancing the quality of life rather than economic growth. - Environmental awareness grows, leading to wide demands for environmentally friendly produced food.
3. Image of the rural future	*3a General (economy)* Moderate economic growth of about 2.8% per year. Technological development focuses on environmentally friendly and sustainable technologies and is bottom-up driven rather than top-down. Population growth continues as now. As there is only a small rural to urban migration, there is no need for many new settlements. *3b Agriculture* Due to technological innovations, new crop varieties are invented that enable higher yields with lower inputs. Agriculture in core production regions becomes high-tech, clean and relatively small scale.

Table A2.15	PRELUDE: Image of the rural future in the Lettuce Surprise U Scenario (continued)
Name	**PRELUDE**
	3c Landscape, nature and biodiversity Due to increased productivity in agriculture, the amount of crop land (-40%) and grassland (-20%) decreases. The reduction of agricultural area and inputs leads to an increase in biodiversity and improvements in the quality of water, soil and air. Cultural landscapes are created and environmentally protected, so that abandoned agricultural land can be used for recreation. Increase in the land used for biofuels of 0.3% p.a. *3d Other* A small growth in settlement areas (+1.2%) (lowest of all PRELUDE scenarios).

Table A2.16	PRELUDE: Image of the rural future in the Big Crisis Scenario
Name	**PRELUDE**
1. Name of the scenario	Big Crisis - Europe of cohesion
2. Description of scenario	*Key developments* - A series of environmental disasters in 2015 highlights Europe's vulnerability and inability to adapt effectively. Basically all major river systems of Europe flood following some terrible storms. Millions of European are left homeless or in danger and try to flee. However, the transportation system collapses. Many people cannot escape from the flooded area and public catastrophe management is simply overwhelmed. - There is a widespread support for a strong coordination of a coherent set of new top-down policies for sustainable and regionally balanced development at European level. - Policies focus on a movement of population from the urban centre of Europe to its periphery. There is an increase of urban land use in the periphery of Europe and its population increase by 2% p.a. Simultaneously, population decreases by 2% p.a. in the 'blue kangaroo'. - A special network of high-speed trains is established, making the cities in the periphery more attractive for working and living.
3. Image of the rural future	*3a General (economy)* Geographically more balanced and sustainable growth in Europe. After the crises in 2015, economic growth is moderate at 2.5% per year. *3b Agriculture* After 2015 agricultural intensity is very low and no further intensification takes place. The main focus is on landscape stewardship. A major shift in eating patterns away from meat is observed after 2015. Hence less grassland for grazing and less crop land for fodder production is needed.

Table A2.16	PRELUDE: Image of the rural future in the Big Crisis Scenario (continued)
Name	**PRELUDE**
	3c Landscape, nature and biodiversity The use of crop land and grassland remains more or less stable, although in the flooding zones and within the 'blue kangaroo' agricultural land use decreases. As environmental awareness increases after 2015, more and more protected areas are designated. *3d Other* There is a slight increase of 1.2% in settlement area until 2035. This growth is due to sustained urban population growth in Europe.

Table A2.17	Agriculture in the overall economy: Image of the rural future in the Baseline Scenario
Name	**Agriculture in the overall economy**
1. Name of the scenario	Baseline
2. Description of scenario	*Exogenous drivers* *Demographics* Major trends as observed in the past. *Macroeconomic growth* Moderate growth as seen in the trends. *Consumer preferences* More demand for value added and increasing absolute spending per capita. *Agri-technology* Continuous trend in cost saving technical progress. *World markets* Trends in agri-markets based on OECD/FAPRI studies. Change from these trends due to different assumptions on exogenous and policy-related drivers, especially the demand for biofuels. *EU enlargement* No further enlargement until 2020 (i.e. EU = EU27). *Policy-related drivers* *CAP* Current system of intervention prices (plus exclusion of maize from intervention in 2009 and butter intervention prices decrease by 15% from 2012 on), reform of sugar market organisation, maintenance of quotas, withdrawal of consumption subsidies, direct payments are constant in nominal terms, full decoupling of direct payments from 2011 on, modulation rate of 20% and removal of mandatory set-aside in 2011 *Biofuel policies* Extension of the area eligible for biofuel crop premium to 2 mio ha; target of a biofuel share of 2% in total EU fuel consumption by 2010 *Trade policies* EU offer 2005 on tariffs and export subsidies in Doha Round.

Table A2.17	Agriculture in the overall economy: Image of the rural future in the Baseline Scenario (continued)
Name	**Agriculture in the overall economy**
3. Image of the rural future	*3a Sectoral employment and employment growth* The share of agri-food sectors in total employment in the EU27 declines from 4.9% in 2005 (4.5% for the EU15 and 12.5% for the NEU12) to 4.2% in 2020 (3.9% for the EU15 and 10.1% for the NEU12). The agricultural sector in the EU27 employs about 8 million people in 2020, about 3.5 million people less than in 2005. The increasing income disparity is the main driver for the decline in the agricultural workforce, with agricultural wages growing less than wages outside agriculture. *3b Agriculture* Apart from policies, the development of the agrifood sectors depends on technical progress in production on the one hand, and on the growth of population and income one the other hand. For the EU15, production is increasing for cereals (+7%) and oilseeds (+10%) and - due to the cut in market price support - decreasing for sugar (-8%). For the NEU10 in contrast, production is stable for sugar and increasing for oilseeds (+35%) and cereals (+11%). Beef production in the EU15 declines (-7%), whereas the production of pork (+11%), poultry (+13%) and cheese (+6%) increases. In the NEU10, animal production increases: beef (+11%), pork (+16%), poultry (+36%) and cheese (+25%). Real EU prices for agriculture decline by about 20% in 2020; real consumer prices fall by over 16%. *3c Landscape, nature and biodiversity* Agricultural land use in the EU25 declines by 2% between 2005 and 2020. **3d Other** Biofuel production in the EU increases from 3.8 MTOE in 2005 to 20.7 MTOE in 2020. This is insufficient to meet internal demand: consumption of biofuel in the EU increases from 3.9 MTOE in 2005 to 29.3 MTOE in 2020.

Table A2.18	Agriculture in the overall economy: Image of the rural future in the Full Liberalisation Scenario
Name	**Agriculture in the overall economy**
1. Name of the scenario	Full liberalisation
2. Description of scenario	*Exogenous drivers* See baseline. *Policy-related drivers* *CAP* Abolishment of all market price support (including intervention prices and border measures), direct payments and production quotas. *Biofuel policies* Abolishment of biofuel premium in 2011.
3. Image of the rural future	*3a Sectoral employment and employment growth* The share of agri-food sectors in total employment in the EU27 declines from 4.9% in 2005 (4.5% for the EU15 and 12.5% for the NEU12) to 4.1% in 2020 (3.8% for the EU15 and 9.9% for the NEU12). This decline is slightly higher than under the baseline scenario: +0.08 percentage points in the EU15 and +0.21 percentage points in the NEU12. *3b Agriculture* Compared to the baseline scenario, crop supply in the EU25 is about 13% lower in 2020 (12% for the EU15 and 17% for the NEU10) and livestock supply is about 8% lower (8% for the EU15 and 9% for the NEU10). Sugar beet production decreases most: -60% in 2020 (highly protected commodity). Real EU prices for agriculture decline by about 14% in 2020; real consumer prices fall by over 13%. *3c Landscape, nature and biodiversity* Agricultural land use in 2020 will be 4% less than in the baseline scenario and will decrease from 152 million ha in 2005 to just below 142 million ha in 2020. *3d Other* No information on biofuel.

Table A2.19	Agriculture in the overall economy: Image of the rural future in the Full implementation of a new EU biofuel directive Scenario
Name	**Agriculture in the overall economy**
1. Name of the scenario	Full implementation of a new EU biofuel directive
2. Description of scenario	*Exogenous drivers* See baseline. *Policy-related drivers* *CAP and trade policies* See baseline. *Biofuel policies* New biofuel directive, which sets a mandatory minimum share of 10% of biofuels in total fuel consumption in the transport sector by 2020.
3. Image of the rural future	*3a Sectoral employment and employment growth* The share of agri-food sectors in total employment in the EU27 declines from 4.9% in 2005 to 4.2% in 2020 (3.9% for the EU15 and 10.1% for the NEU12). This decline is slightly lower than under the baseline scenario in the EU15 (0.02 percentage points) and similar to the baseline scenario in the NEU12 in 2020. *3b Agriculture* The biodiesel price increases by 18% in 2020 compared to the Baseline scenario. This has a positive impact on the overall price level for crops in the EU (+1.7%) relative to the Baseline scenario, but the price level for animal products declines by 1.3% in the EU, as livestock production increases due to lower feed prices (increased supply of by-products of the biofuel industry is used in animal feed). *3c Landscape, nature and biodiversity* Agricultural land use in the EU25 declines by 1.6% between 2005 and 2020 (-2% in baseline scenario). *3d Other* Compared to the Baseline scenario, both EU production and consumption of biofuel is higher in 2020. However, the EU production of 23 MTOE is insufficient to meet internal demand of over 34 MTOE. So imports of biofuel will rise further as compared to the Baseline scenario.