ALTERNATIVE FUTURES OF RURAL AREAS IN THE EU: A COMPARATIVE ANALYSIS OF SCENARIO STUDIES

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Abstract
What does rural Europe look like in 2030? Is agriculture still the main land user? In recent years, studies such as ESPON, Eururalis, SCENAR2020, SENSOR, SEAMLESS and PRELUDE have tried to address these questions. These studies resulted in a number of alternative futures of rural areas in the EU.
In this paper a comparative analysis of these scenario studies is made in order to explore differences and similarities in the scenarios and alternative futures of rural areas in the EU. For this purpose, we designed a scheme for assessing the properties of the various scenarios and a scheme for a systematic description of the rural futures according to the scenarios.
It appears that most scenario studies use a baseline scenario and a set of alternative scenarios with different degrees of policy regulation. Agriculture will continue to be a main land user in 2030, although some land abandonment will take place.

Keywords:
Keywords: Rural Europe, scenario studies, alternative futures, land-use, territorial disparities.

Introduction
What does rural Europe look like in 2030? Is agriculture still the main land user? Is there large scale land abandonment? 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? Are rural regions an integrated part of the European economic centre, or have they become marginalized? The answers on these and other questions could help to create an image of the future of rural Europe. In recent years, a number of scenario studies have tried to address these questions, like ESPON (ESPON Project 3.2, 2006; 2007), Eururalis (Rienks, 2008), SCENAR2020 (Nowicki *et al.*, 2006), SENSOR (Kuhlman *et al.*, 2006), SEAMLESS (Pérez *et al.*, 2007; Van Ittersum *et al.*, 2008), PRELUDE (EAA, 2007) and 'Agriculture in the overall economy' (Banse and Grethe, 2007).

The alternative futures of rural areas in the EU in the above mentioned 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, like population growth, economic growth and climate change. These 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).

The aim of this paper is to explore alternative futures of rural areas in the EU. For this purpose, a comparative analysis of seven recently published 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.

In section 2, we discuss some methodological issues on the design of scenarios and we introduce schemes for assessing the properties of scenarios and for a systematic description of the rural futures according to the scenarios. In section 3, we make a comparative analysis of the scenarios. In the final section, we give some concluding remarks.

Methodological approach

Different methods can be used for describing the future, like literature reviews, scenarios, brainstorming and expert panels (EFMN, 2006). The exploration of rural futures in Europe in this paper is restricted to scenarios. In this section we first discuss some methodological issues on the design, content and nature of scenarios. 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. These two schemes are used in the comparative analysis of the seven scenario studies.

Approaches to the design of scenarios

Kuhlman *et al.* (2006) distinguish four different approaches of the design of scenarios:

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 set of future worlds is described and the ‘real’ future is hopefully somewhere in between;

4. imaginative approach, where a set of futures is described, which need not to be plausible.

Scenario content characteristics
Various characteristics of the contents of scenarios and their range are presented in Figure 1. The temporal nature reveals whether the scenarios show the whole chain of events 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 and the origin of the variables can vary: heterogeneous variables cover a wide range of fields, whereas homogenous variables include variables of one field. The dynamics in the scenario mirrors the changes that can be built into the scenario: a discontinuous scenario allows for breaks whereas a trend scenario does not. The level of deviation indicates how far apart the scenarios in a study are. The dimension 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 quantification and qualification refers to how thoroughly the scenarios are described.

Characteristics	**Range**	
Temporal nature	chain of development ⟷	snap-shot at the end
Nature of variables	heterogeneous variables ⟷	homogenous variables
Origin of variables	external factors only ⟷	external and internal factors
The nature of the dynamics	discontinuous scenario ⟷	trend scenario
Dimension 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

Figure 1 Scenario content characteristics
Source: Van Notten et al. (2003); IPCC (2005); adaptation LEI.

Nature of scenarios: predictive, explorative and normative
Börjeson *et al.* (2006) make a distinction of scenarios according to their nature (Fig.1). The three categories predictive, explorative and normative are based on the

questions: ‘What will happen?’, ‘What can happen?’, and ‘How can a specific target be reached?’ As a next step, each category is divided into two subtypes. Forecasts usually include a reference scenario plus a high and low alternative, whereas in a what-if scenarios the future effect of a certain decision is analysed. External scenarios answer the question what can happen to external factors, while strategic scenarios address the question what can happen if we act in a certain way. Preserving scenarios respond to the question ‘How can we reach the target by adjustments to the current situation?’ while transforming scenarios respond to ‘How can the target be reached when the current structure blocks change?’

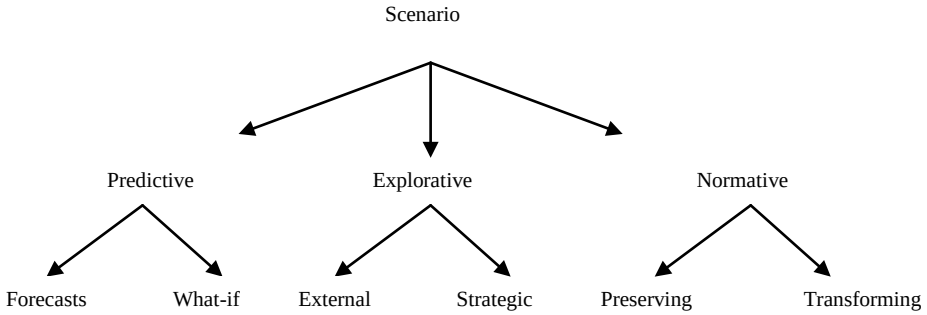

Figure 2 Scenario typology according to their nature
Source: Börjeson *et al.* (2006).

Scheme for assessing and describing scenarios on rural futures
The assessment scheme for structuring our analysis of the scenario studies (Table 1) was designed based on the scenario typologies presented in the previous section. In the next step, a framework for a systematic description of the images of the rural futures in the EU was developed (Table 2).

Table 1 Scheme for assessing scenarios in this study

Name of the study	
1. Source/Report reference	
2. On-line source	
3. Sponsor	
4. Geographical scope	
5. Spatial unit	
6. Objective of the scenarios	
7. Number and names of the scenarios	
8. Time scale	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	
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?
15. What are the drivers in the scenarios?	
16. Methodology for calculating scenarios	Indicate which methodology has been used: • extrapolating trends; • models; • expert judgement; • other.
17. Variables used to describe the images of the rural future	

Table 2 Scheme for describing the images of the rural futures in the scenario studies

Name of the study	
1. Name of the 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.

Comparative analysis of scenario studies of rural areas in the EU
In this section we make a comparative analysis of seven scenario studies of rural areas in the EU, based on the two schemes designed in the previous section. The studies are Agriculture in the overall economy, ESPON, EURURALIS, PRELUDE, SCENAR 2020, SEAMLESS and SENSOR.

Scenario description
The seven scenario studies aim to explore future trends and driving forces, shaping 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.

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, is the most common approach of the scenario studies. Usually, these alternatives refer to a liberalization 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, deviates from the other scenario studies. PRELUDE 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. Eururalis employs a set of four contrasting futures, derived from opposite dimensions of policy intervention and global market integration.

In all scenario studies, macro-economic growth and demographic changes are included in the exogenous drivers. Also policy drivers are included in all studies, for example CAP, transport policies, EU enlargement and R&D policies. Some studies also use technological progress, energy prices, climate change, consumer preferences, and norms and values as drivers.

All scenario studies use a multi-model framework referring to different spatial levels (world, EU, region, grid) and to different aspects of the rural world. Sometimes already existing models were used, like GTAP, ESIM, CAPRI and CLUE; in other cases new models were developed, like the MASST and the KTEN models in ESPON and the FSSIM-EXPAMOD and the APES models in SEAMLESS.

Images of the rural futures in the EU according to the scenario studies
Together, the seven scenario studies result in 19 different rural futures. SEAMLESS and SENSOR deviate from this in that they do no produce images of rural futures but interactive tools. By using the assessment scheme given in Table 3, the 19 alternative futures were divided into a smaller set (Jansson and Terluin, 2009). We first distinguish three rural futures that are derived from the level of policy intervention:

1. *rural future in the EU: baseline*

Globalisation has a strong and accelerating influence on the process of job creation and destruction. Metropolitan regions with advanced technologies benefit. Population stabilizes in the EU; however, remote rural regions face depopulation. Drought has led to agricultural abandonment in Southern Europe. The production of biomass and energy crops gives a new impetus to agriculture. Agricultural production in 2020 needs 91% of the agricultural land used in 2000/2002.

2. *rural future in the EU: competitiveness*

All efforts are concentrated on increasing global competitiveness. The economy flourishes with a high level of technological innovation. Territorial disparities increase between metropolitan areas and other areas. There is rapid and radical liberalization of CAP. Agriculture intensifies, becomes high-tech and concentrates in areas that are optimal for production. Agricultural production in 2020 needs 86% of the agricultural land used in 2000/2002.

3. *rural future in the EU: cohesion*

Support for technological development is concentrated to less-favoured regions. Non-metropolitan areas benefit. There is net migration from the most densely populated urban areas towards peripheral regions. Ambitious policies on environmentally sustainable regional development and minor CAP reforms (mainly modulation). Farming is high-tech and increasingly organic. Agricultural production in 2020 needs 96% of the agricultural land used in 2000/2002.

As PRELUDE does not start from the degree of policy intervention, we also distinguish three rural futures according to disruptive events:

4. *rural future in the EU: clustered networks*

Migration away from polluted urban areas is encouraged. Fourteen new medium-sized cities outside the main urban centre are created. These generate changes in infrastructure, employment opportunities and activities in peripheral regions. Globalization propels economic growth. Deepened international trade relations lead to marginalisation of agriculture and production continues only in the most favourable areas. Due to large scale land abandonment, the amounts of crop land and grassland have decreased by about one third in 2035.

5. *rural future in the EU: lettuce surprise u*

A major food security crisis hits Europe in 2015. As management during this crisis fails, faith in central government and in food security decreases strongly. Political decentralization becomes prominent and policy focuses on enhancing the quality of life. Environmental awareness grows, as does demand for sustainably produced food. 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 by 2035.

6. *rural future in the EU: big crisis*

A series of environmental disasters in 2015 highlights Europe's vulnerability and inability to adapt effectively. After these crises, policies focus on a movement of population from the urban centre of Europe to its periphery. There is a widespread support for sustainable and regionally balanced development at EU level. Agricultural intensity is low. The main focus is on landscape stewardship. The use of crop land and grassland remains more or less stable.

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. PRELUDE and Eururalis, however, deviate from this approach. PRELUDE assumes a number of disruptive events in the near future, whereas Eururalis employs four contrasting scenarios, derived from opposite dimensions of policy intervention and global market integration. We were able to derive six distinct alternative futures of rural areas in Europe from the scenario studies: 1. baseline; 2. competitiveness; 3. cohesion; 4. clustered networks; 5, lettuce surprise u; 6. big crisis. For agriculture many different futures are outlined: intensification, industrialization, high-tech varieties with higher yields and lower inputs, focus on organic production, new impetus of biomass and energy crops, marginalization and land abandonment. In 2035, projections of agricultural land use vary from two thirds to 100% of current land use.

Policy implications

The images of a competitive and cohesion rural future reflect the dichotomy in regional 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. The current financial crisis of the world economy seems to confirm that disruptive events, as assumed in PRELUDE, are not pure imaginative events, but might be among the set of possible rural futures. This reveals that main challenges for Europe's rural future are not necessarily contained within the 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).

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