

Your vision or my model?
Lessons from participatory land use scenario development at the European scale

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“Formalised and non-formalised methods in resource management.
Knowledge and learning in participatory processes

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Introduction

Participatory processes in scenario development have received increasing attention throughout the last years. Bringing together multiple perspectives and different types of expertise can, in principle, enhance the information basis and legitimacy of scenario studies and thus improve conditions for organisational learning and change.

Participation, however, comes in many variants and can serve different functions. Choices about who participates, in which role and with what capacities, in both the framing and production of a scenario assessment affect the credibility, salience and legitimacy of any exercise of any kind (Eckley, 2001).

The European Environment Agency (EEA) has been using different participatory approaches in several of its assessments. As a minimum, all published reports undergo a thorough consultation with all the EEA member countries (32 countries). Other assessments extend their consultation to other communities, such as NGOs, business, and professional associations, depending on the issue and goal of the assessment. In the last years, and with the goal of increasing the legitimacy and relevance of its scenarios assessments, the Agency has engaged in scenario development with high levels of participation.

In a recent project called PRELUDE -*Prospective Environmental analysis of Land Use Development in Europe* a wide number of stakeholder were recruited for an exercise where main decisions were taken by the group. The overall goal of PRELUDE was to develop participatory land-use scenarios for the EU-25 plus Norway and Switzerland for a time period of about 30 to 40 years. Qualitative information and model quantification were combined in an iterative way to create scenarios at the European scale, which were further broken down to the regional level in three case studies.

Combining participatory-driven storyline development and model simulation offers unique opportunities to mix good data, scientific rigour, imagination and expertise

from different perspectives. It can create well-founded, provoking scenarios that represent a wide range of possible futures. However, this task is all but easy. It requires a careful balancing of both approaches and clear roles and responsibilities. Furthermore, the integration of formal and non-formal approaches requires the acceptance of different levels of knowledge, as well as trust in different methods across disciplinary boundaries. Most of all it requires the conscious acceptance of trade-offs between modelling capabilities and human reasoning. It is therefore important to think carefully why and to which extent stakeholders should be involved and clarify the roles and responsibilities of modellers and stakeholders before starting the process. PRELUDE offers some interesting insights in this regard.

In the final paper, we discuss advantages and trade-offs of combining participatory and expert-based methodologies in the context of the “Story-And-Simulation” approach (Alcamo2001). This discussion serves as a background for a comprehensive review of the experiences gained within the PRELUDE project, pointing to challenges and highlighting possible solutions.

Approach & background

The development of scenarios in the PRELUDE project was based on the “Story-and-Simulation” approach, where a group of stakeholders develops the qualitative storylines which are formalised and quantified by models. Stakeholders and modellers engage in an iterative process of defining and refining storylines and quantification until a set of compelling, plausible, consistent and relevant stories and simulations about the future is reached.

Every approach has its drawbacks and this one is no exception: it can be a time-consuming and costly approach; it demands high level of engagement and availability from stakeholders and modellers alike; and it requires the use of transparent methodologies in the ‘translation’ of quantitative statements into quantitative modelling inputs. Depending on the complexity of the issue it can take up to two or three iterative rounds to come to a common understanding about driving forces, uncertainties and final scenario logics, establishing good working relationships between facilitator, stakeholders and modellers and, finally, arriving at a consensus about the qualitative scenario content and its effective translation into quantitative model inputs. However, following this approach can lead to interesting results when analysing long term developments: scenarios can be developed without the restrictions of existing *state of the art* models and data limitations in mind, include issues that science may not yet be able to model in quantitative terms, while, simultaneously benefiting from the rigour and consistency check that models can provide.

The PRELUDE scenarios combine the assessment of changes in the bio-physical environment with simultaneous changes in the socio-economic environment. Whereas environmental change scenarios have been widely developed, social and behavioural change scenarios are less well developed. Up to now most scenarios of this kind focus on qualitative descriptions. This is especially true for the construction of integrated long-term scenarios for land use change, which face the problem of integrating a set

of different driving forces within a consistent internal framework of analysis (Rounsevell, Ewert, Reginster, et al., 2005).

The first step in the PRELUDE process was the setting up of a meaningful stakeholder panel for the issues in discussion. It consisted of over 22 stakeholders and modellers from across Europe with a broad diversity of backgrounds, i.e. policy-makers, academic researchers, representatives of interest groups, independent thinkers and land-use modellers. Over a year, stakeholders met three times for three-day-workshops to discuss key uncertainties and underlying driving forces, develop scenario logics and storylines and explore the land-use patterns and related environmental impacts. The qualitative scenarios were underpinned by quantitative analysis with the help of state-of-the art land use simulation models in two iterative modelling rounds.

The PRELUDE process was rather unique in what concerns two important elements in scenario development: trust and ownership. Trust relationships among participants are difficult to build, but they are a key success factor for the whole exercise: if single stakeholders manage to manipulate or even capture the process, it will lose its credibility for other participants and they might even disengage from the process. If there is a lack of consensual support and ownership, scenarios lose their trustworthiness and authority (Selin, 2006). In order to avoid such pitfall number of steps were taken among which we would emphasise: 1) the selection of stakeholders was done thoroughly using very clear criteria; 2) the rules of engagement were agreed upon at an early stage in the process; 3) the discussion were facilitated by an external, partners, with no interest at stake in the subject; 3) stakeholders were led through a scenarios building process by experienced facilitators, well versed in this complex and, at times extremely demanding interaction. After long discussions and revisions, the process resulted in five divergent scenarios.

PRELUDE scenarios

Stakeholders categorised a broad variety of driving forces that influence different land use types and land use change in Europe. Consequently a common basis for comparison was needed. This was done in the following step-wise approach:

- “Influence chains” were generated by the group and agreed upon.
- These influence chains and general driving force categories were used to derive a consistent set of 20 driving forces.
- Together with the stakeholders, the magnitude of change of the driving forces was qualitatively valued for each scenario on a scale from 0 (minimum value) to 10 (maximum value).
- This scale was adjusted to for the model inputs into acceptable values for each driving force, based on past data and existing authoritative scenarios for other issues (e.g. IPCC scenarios), Each scenario is thus based on a set of comparable, but different demographic, social, economic, technological and environmental developments.
- Finally, the 20 driving forces were clustered into five main categories scenario-specific “spider diagrams” were created, visualizing the different driver values in a comprehensive and easily comparable way.

The Louvain-la-Neuve land use/cover change model was used for assessing the changes in land use/cover at the European level. The model produces maps and data tables for Europe (EU-25 plus Norway and Switzerland) with the percentage change of each land use/cover class as compared to the total area of the 10 minute (latitude and longitude) grid. The PRELUDE scenario descriptions and analysis refer to six broad land cover classes which are 1) urban land, (2) cropland, (3) grassland, (4) forest, (5) other land, and (6) surplus land. In order to make the link between land use/cover changes and environmental impacts, we used the concept of “dominant” landscape types and land use intensities. Starting with the five land cover classes (1) urban land, (2) cropland, (3) grassland, (4) forest, and (5) other land, dominant landscape types were assigned in each model cell for both the base year situation and for each of the five scenarios in 2035. Based on this analysis of the dominance that occurs in the model cells in all of Europe, nine landscape types are derived.

Five compelling scenarios were developed:

1. *Great Escape - Europe of contrast*
2. *Evolved Society - Europe of harmony*
3. *Clustered Networks - Europe of structure*
4. *Lettuce Surprise U - Europe of innovation*
5. *Big Crisis - Europe of cohesion*

Great Escape: This scenario is driven by globalisation, decreasing solidarity and passive government. Climate change affects the growing conditions for agriculture. The agricultural market is liberalised and only large-scale farms with intensive management survive the pressure from the world market.

Evolved Society: Main ingredients in this scenario are an energy crisis, growing environmental awareness and active rural development. Serious flooding occurs and people leave the most vulnerable areas. They rediscover the countryside where small-scale organic farming, supported by policy measures, increases.

Clustered Networks: This scenario is all about optimization of land use and strong spatial planning in response to an ageing of society and a declining agricultural sector. Climate change is a less prominent driver in this scenario.

Lettuce Surprise U: The essential drivers here are growing environmental awareness, technological innovation and decentralisation. Agriculture revolutionises, facilitated by open source mentality and propagation of knowledge. Production becomes small-scale and less intensive.

Big Crisis: In this scenario climate change related disasters and increasing solidarity are all-important. Floods and droughts affect many people and trigger strong European policy interventions, aimed at a balanced social, economic and environmental development.

Scenario analysis - some lessons

The scenarios show different patterns of change in land use and landscape types. In three scenarios, migration increases urban change considerable at local level. The

spatial patterns of urban change are different for all scenarios, but for the majority of them, rural areas or small cities seem to be more attractive than large cities.

In three scenarios, a considerable high share of agricultural land is abandoned, either due to global market forces or new technologies. Cropland decreases at higher rates than grassland. Fewer changes are observed for the more environmentally-oriented scenarios because of the extensification of agricultural land and landscape preservation.

Forest land increases only slightly for all scenarios, based mainly on current trends of afforestation, which are low and which are assumed to continue in all five scenarios.

Shifts in land use patterns do not occur homogeneously throughout Europe. Whereas Scandinavia remains almost unchanged in all five scenarios, changes are particularly large for Eastern Europe, the Iberian Peninsula, and some Central European countries depending on the particular scenario. Landscape patterns can change considerably, depending on the scenario.

Developing the scenarios constituted a learning process in itself for all stakeholders involved. Each scenario shows a plausible path to the future, following the occurrence of a number of sequential events, and the societal responses to them. Equally, the interested groups can use this analysis to challenge their views on the 'official future', explore different plausible paths to the future and, eventually, identify leverages to steer the course towards a more desirable outcome.

Some potentially broader patterns of land changes lead to a more general discussion about the policy implications. Given the magnitude of expected change, the ability to conserve all areas of interest is highly unlikely. To use our resources most effectively, it may be necessary to set stricter intervention priorities. Targeted coordination between regional, national and European sectoral policies, in particular those concerning transport and agriculture, and could improve local conservation efforts, making them more effective - but finding the right level between centralised and decentralised governance approaches remains a difficult task to solve.

We conclude the paper by discussing the lessons learnt regarding the participatory development of large-scale scenarios. Above all, the chosen approach has proven its usefulness. Stakeholders did not only manage to create interesting stories, but moreover they developed a strong trust into the validity and suitability of the own problem analysis and the scenarios. Nearly all stakeholders had a strong feeling of ownership for the scenarios, showed a high level of appreciation for the process, and were eager to participate in all workshops. Furthermore several of them have reported on the usefulness of the process for thinking long term, and are bringing the scenarios perspective into their daily jobs and discussions.

However, trade-offs between modelling capabilities and human reasoning have to be taken into account consciously. The formalisation and quantification of the qualitative scenario input provided by the stakeholders brought along several problems that shed light on further methodological development needs. Nevertheless engaging in highly participative scenarios process, while cumbersome, significantly increases its acceptance and legitimacy among a wider audience.

