

# Pathways to the Future: Community Dialogues on Adaptive Environmental Management Through Scenario Projection in Google Maps

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This paper presents research on the potential of interactive media for regional community dialogues on future uncertainties and complexities in coupled human and natural systems. More adaptive perspectives on natural resources management are needed to respond to rapid environmental and social change. Scenarios are a useful tool for participatory explorations of future issues that are high on uncertainties and complexities. We explore how scenarios can bank on the communicatory effectiveness of interactive media to increase their impact. We present a method, the Scenario Communities project, currently in testing phase, that combines strategies from serious gaming, landscape visualization and web 2.0 technology. We also present a number of visual tests that we use to analyse the effects of the scenario communication.

**Keywords** participatory scenarios, geo-web, community learning, adaptive environmental management

## 1. Introduction

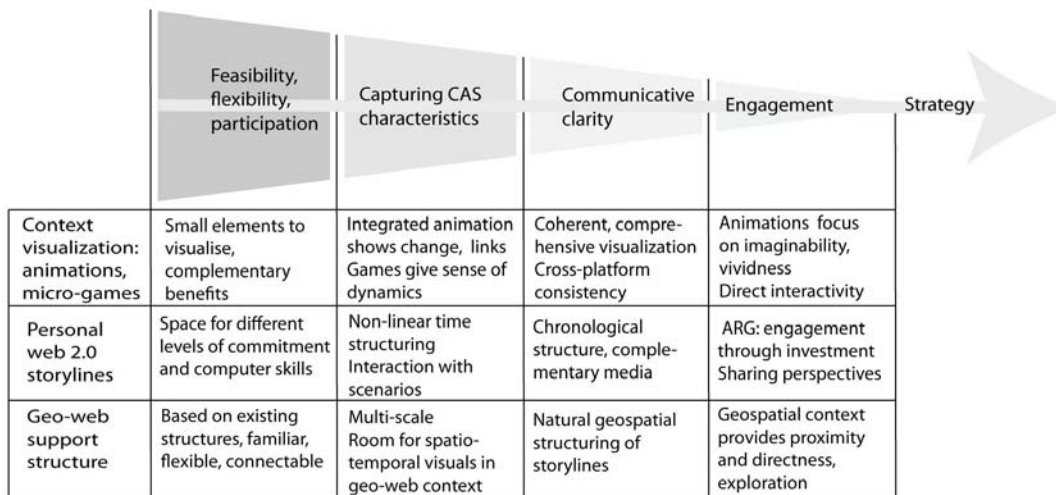
In a time of accelerating social and environmental change, our ideas on how human and natural systems will shape the future determine what we do today. New scientific insights into the complexity and uncertainty inherent in these interlinked „social-ecological systems“ [1] advocate more adaptive attitudes towards the management of natural resources [2]. According to these insights, responsible societal actors must, for instance, be prepared to deal with sudden change, to keep changes on higher and lower levels of organization in sight, and be able to incorporate knowledge from a diversity of perspectives. To convey the value of adopting these practices, we need effective means of communication.

Using future scenarios, scientists and policy makers can help communities create and explore visions of possible futures. We define scenarios as *descriptions of possible futures that reflect different perspectives on past, present, and future developments* [3]. Scenario developers working within the field of environmental and ecological assessments have, so far, made little use of the potential of (web-based) media for interactive future visioning. However, there are a number of research domains dealing specifically with the visualization of futures and/or sense-making in the face of complexity and uncertainty. Landscape visualization [4], serious gaming [5] and visual analytics [6] all have insights to offer for scenario developers that wish to bank on the communicatory potential of interactive media [7]. On-line interaction tools have opened up another dimension for dialogues on future complexities and uncertainties [8].

To explore this potential, we have developed a Google Maps-based [9] platform for scenario co-creation, to be used by regional communities concerned with sustainable development. As a result of participants' interactions in the exercise, we aim to increase their future orientation and elicit their perspectives on adaptive management.

## 2. Methods

To design our scenario communication method, we constructed a criteria succession for the evaluation of different options [7]. See Fig.1 for the structure of this succession and a description of the benefits of our method according to these criteria. Our method combines elements of landscape visualization, serious gaming and contribution of content through web 2.0 tools. It consists of three main elements or levels, and operates on (at least) two spatial scales.



**Fig. 1** *The Scenario Communities method design.* The arrow in this figure shows a criteria succession, determining choices for interactive media strategies. Below, three levels/elements of the Scenario Communities method are evaluated in terms of this criteria succession.

These are the elements or levels of the Scenario Communities method:

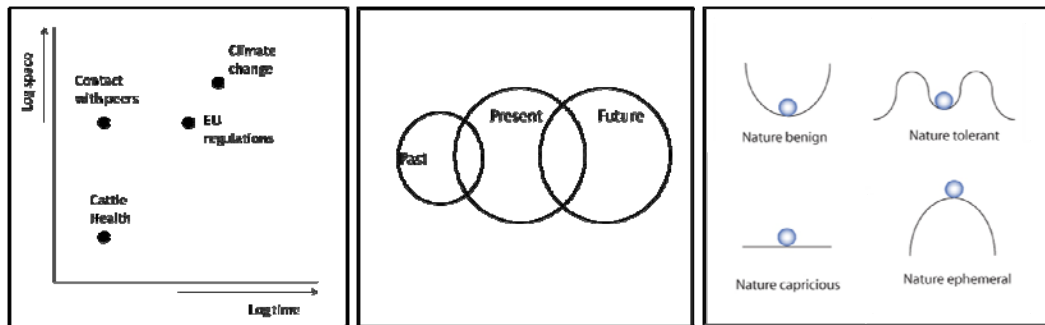
1. Basic scenario storylines, created with a small group of regional experts, serve to communicate the regional context, and are set up as inspiration for participants to create their individual storylines. We will employ two variations of this design in two case studies:
  - a. Sustainable woodland development communities in Oxfordshire, the United Kingdom (currently in progress). In this case study, we use a series of Flash-based animations to introduce regional context storylines.
  - b. Alternative dairy farming and regional co-operation on sustainable development in the Northern Frisian Woodlands (first contact with stakeholders established). In this case, we will create a series small, scene based micro-games for each regional context storyline, the results of which will be translated to a spatial-temporal map in Google Earth [10], showing the participant the consequences of choices in the micro-games.
2. Personal storylines created by participants in response to the regional context scenarios. Participants get a personal space, similar to that of social networking websites, to create a local interpretation of the inspirational storylines. Participants can use text, photos, sound and video to make their personal storylines more vivid.
3. The web-site is linked to Google Maps [9] to provide a geographic way to access the personal storylines. Participants choose to tell their personal scenario storylines from a specific location in Google Maps. This way, a rich tapestry of detailed, personal explorations of the future is created. An added effect that we hope to investigate is whether participants that create storylines that are geographically close to one another will be motivated to respond to each other's storylines, and thereby create an interaction on a spatial scale between the local and the regional.

We reviewed the conceptual design of this method in the first phases with a stakeholder panel in our first case study: regional sustainable woodland development communities in Oxfordshire – United Kingdom. We received favourable responses to our approach, and modified design elements based on their comments.

### 3. Analysing the method's effectiveness.

We will test the communicatory effectiveness of our Scenario Communities method in three complementary ways: with before-and-after measurements through a series of visual tests, through in-depth interviews, and through direct conceptual analysis of participants' contributions.

Participants start with a series of web-based visual tests to examine their perspectives on time, issues of scale, and the dynamics of human and natural systems. See Figs 2a-c for these tests.



**Fig.2a.** Scales test

**Fig. 2b.** Circle test

**Fig. 2c.** Myths of nature

Fig.2a,b,c show the different visual tests used to analyse stakeholder perspectives on systems complexity before they are introduced to the Scenario Communities method.

The first visual test lets participants place what they see as the top issues for their regional environment on a log-log scale of time and space (see Fig.2a). This way, we can examine a participants' time horizons [11], and how many scales of time and space they consider as a part of their perspectives. We then complement our examination of participants' time orientation with a simple visual test, Cottle's [12] Circles Test (see Fig.2b). Participants shape three circles, one representing past, one present, and one the future, in size according to the importance they assign to each of these time elements. The placement of these circles is up to the participants, and this placement can then be read to get a further indication of their time orientation. The Circles Test has been proven to be a reliable representation when compared to other time orientation measurement methods [11]. Finally, participants choose one among several „myths of nature“ [2], representing perspectives of how natural systems respond to disturbance (see Fig.2c). This combination of tests gives us an assessment of participants' perspectives on cross-scale interactions, system behavior and time orientation before they interact with the scenario communication tool. The visual nature of these tests makes them at once accessible and fairly quick to use, as well as consistent with our visual approach to knowledge exchange.

#### 4. State of the project

The Scenario Communities tool is currently in a beta testing phase. Two series of animations have been created for the Oxfordshire case from the context storyline development with a regional expert panel. The method will be introduced through a number of workshops, and then through on-line dispersion. The visual tests analysis is operational and has been tested for ergonomics.

#### 5. Acknowledgements

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