

# Participatory scenario development for climate change adaptation

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## Introduction

A growing number of studies on the impacts of climate change and potential adaptation options are becoming available. However, they commonly fall short on integrating climate change impacts and adaptation options into development choices and priorities, as well as lacking proper descriptions of the influences that different development options might have on adaptation and adaptive capacities. Scenario development methodologies provide a useful way of exploring future development choices and pathways and the impacts of climate change and adaptation options, as well as the forms of policy or investment support needed to facilitate effective adaptation. They provide a means for policy makers and service providers to take into account local people's priorities and knowledge in their decision-making.

## Participatory scenario development

Scenarios are neither predictions of socio-economic development nor impacts of changing climate; rather they are plausible

descriptions of how the future might develop, using current information and assumptions about future trends. They also help to explore the differing outcomes that might result if basic assumptions are changed (UNEP, 2002). In order to fully explore opportunities from scenario approaches, growing attention is being devoted not only to the developed scenarios, but also to the scenario development process. This includes an increasing emphasis on stakeholders' involvement in developing scenarios – referred to as participatory scenario development (PSD).

Currently available studies show differing degrees of participation in scenario development, varying from involving stakeholders as reviewers of the scenarios developed by climate change 'experts' to having stakeholders develop and assess the feasibility of the scenarios. We found the most effective process to be one which brings together stakeholder and 'expert' knowledge. This includes:

- involving stakeholders in creating locally relevant responses that are the **combination**



Photo: Livia Bizikova

Figure 1: Scenarios created during PDS workshops in Hungary (Lake Balaton region), using collage technique.

of development choices, adaptation options, and capacities;

- creating learning opportunities for stakeholders about the impacts of a changing climate and their implications at the **local** level; and
- promoting collaboration between researchers and stakeholders to help balance the **biophysical** risks associated with climate change and **social** risks and issues, such as local well-being, access to basic services, employment, and food security.

#### Key steps in participatory scenario development

Combining qualitative stakeholder and quantitative scientific information (i.e., climate change projections and impacts) in PSD offers a unique opportunity to mix good data, scientific rigour, imagination, and expertise from different perspectives (Volkery *et al.*, 2008). The PSD consists of the following five steps:

**Defining the scope of the scenario process:** changing climate will affect diverse areas and sectors in different ways and the impacts will change with progressive climate change. A key question therefore is: under available projections of climate change, how might the community adapt its plans and policies to make the most of their potential future development?

**Identifying key factors shaping local development:** gathering information about the current system will help to frame what measures are feasible in the short- and long-term, and what the capacity gaps are with regard to development and adaptation needs. Key factors shaping local development could include key economic sectors, population changes and migration, access to basic services, poverty levels, and available infrastructure.

**Developing scenarios:** based on discussing how the identified factors will evolve in the future. This implies identify-



Photo: Livia Bizikova

Figure 2: Impacts of climate change on local environment and human well-being, adaptation options, and future scenarios in Southern Ghana.

ing a long-term target vision and options that trigger movement towards this moving target in a sequential fashion.<sup>1</sup> Only internally consistent combinations, i.e., those where developments in one factor do not contradict developments in another, are considered. For the development of scenarios, different techniques can be used, such as collages or index cards (Figure 1).

**Reviewing scenarios:** the identified scenarios should be carefully examined for their potential to determine climate change impacts on the attainment of local development visions. We used ‘what if’ questions to determine whether changes

or trends in biophysical indicators such as future rainfall patterns, sea-level rise, or changes in the number of consecutive hot or cold days could be addressed within the scenarios. This included identifying the impacts of climate change on the local environment and human well-being, and then identifying adaptation options (Figure 2).

**Strategy building:** if we want to be effective in reaching the long-term vision, short- and long-term actions need to be identified. This includes identifying policies needed to create an enabling environment for moving from scenarios and identified adaptation measures to actions.

<sup>1</sup> A vision refers to a moving target guiding the self-organising, innovative forces of a society, forces that otherwise would remain diffuse. It differs from a goal in that it is a tangible image of a future society without being subject to fierce arguments about exact definitions that characterise the operationalisation of goals (Jaeger *et al.*, 2000).

## Case study: PSD in Lake Balaton, Hungary

This case study was co-led by the research team and the local development agency – the Lake Balaton Development Coordination Agency (LBDCA).<sup>2</sup> The researchers provided information on climate impacts and adaptation, and guidance on the participatory sessions and synthesising the outcomes. The local development agency was responsible for identifying and gathering practitioners for the participatory activities, and communicating the outcomes to local NGOs, council members, and news channels.

### Preparing for the PSD

Prior to the PSD session, we developed a series of participatory events to explore climate change impacts and adaptation. We started with an assessment of climate change impacts at 50 km<sup>2</sup> resolution using already published projections for the country. This was followed by focus groups and brainstorming sessions to discuss what the local impacts could be. For example, the effects of the predicted drop in summer precipitation could lead to losses in agricultural production, decreases in water availability, and negative impacts on local biodiversity and on local business revenue. The participants helped to interpret down-scaled model outputs and identified major consequences of the impacts in relation to other vulnerabilities that the region is facing. They drew on their own expertise and knowledge of the region, evaluating lessons learnt from past extreme weather events and sharing experiences about the effectiveness of past responses.

After gaining an understanding of the consequences of climate change at the local level, we held three participatory workshops in different locations in the area to identify adaptation options. We discovered that many adaptation options had already been implemented autonomously at the

individual level, and the workshops provided opportunities to share the lessons learnt from this. In some cases, gaps and barriers in standards and codes that prohibited the use of local materials were identified, as well as complex approval procedures for measures that affected a number of sectors. The workshops also highlighted a lack of technical expertise that hinders putting potential solutions into action. We concluded these sessions with a list of priorities for action on adaptation.

### The PSD workshops

The PSD one-day workshops included approximately 80 participants from local universities, high schools, local business organisations, farmers' organisations, municipal officials, local NGOs, and other community members.

The objective of the PSD was to create scenarios of potential development for key sectors of the local economy (including agriculture and tourism) while protecting biodiversity. Key factors that are important for the local economy and can contribute in developing adaptation actions and capacities were identified through stakeholder group consultations focusing on economic, environmental, and social issues. The key factors identified were:

- water resources management focused on policies influencing water level in Lake Balaton;
- agricultural practices, including planted species and available irrigation systems;
- economic performance of the agricultural sector;
- tourism development – represented by tourist nights per season, revenues, employment, and seasonality;
- shoreline property development; and
- biodiversity protection, including current population of protected species and sizes of habitat.

<sup>2</sup> Livia Bizikova and László Pintér were key members of the research team, which also included Dr. Anthony Lehmann from UNEP/DEWA GRID-Europe and University of Geneva, Dr. Karoly Kutics (K+KConsulting), Jill Jeager (SERI), and many others.

Current trends were then identified for the factors by analysing collected statistical data.

Focusing on these key factors, groups of stakeholders then developed future scenarios that were desirable yet plausible future pathways, attainable from the current conditions. The scenario process included creating a vision for the future of the key factors and identifying actions to reach these visions. Vision development was done in small groups of stakeholders of diverse expertise and affiliations using a collage technique (Figure 1).

Some of the identified actions included:

- protecting agricultural land and sensitive shoreline by limiting development;
- accelerating the use of local grape species and diversification;
- creating agricultural extension agencies and incentives for local markets; and
- development of small and medium enterprises, especially in towns with less intense tourism.

We then reviewed the scenarios, using ‘what if’ questions. For instance, can the projected further reduction in summer precipitation and increasing temperatures be addressed within the community’s visions for the future? Local experts presented climate change projections relevant for the region and then groups of stakeholders identified potential impacts and adaptations and then, in small groups, assessed whether these impacts and adaptations were included in the future scenarios.

Identified impacts included:

- changes in the volume, intensity, and timing of precipitation;
- decreased snowfall;
- critical water and heat stress on newly established vineyards;
- increased erosion;
- disturbances such as wildfire and insect outbreaks; and
- changes in vegetation growth.

A list of adaptation options in the context of regional agriculture were then added to the local scenarios:

- increased rainwater storage capacity to respond to the droughts;
- increased diversity of planted crop varieties and species, including those tolerant to heat and drought;
- increased emphasis on planting native and traditional species and varieties;
- more widespread use of mulching and permanent cover to increase moisture retention in soils;
- introduction of shade-producing plants to create sun shelters during heat waves;
- increased efficiency of irrigation techniques; and
- adjusted planting schedules.

Lastly, we followed up the scenario exercise with the development of policies and actions needed to support adaptation to climate change while moving toward the community’s desired goals for the future. Short-term actions, for example, included increasing the efficiency of irrigation (including small-scale actions) and promoting local and traditional food production. Examples of long-term actions included developing a local food security strategy and making a long-term commitment to a restricted land-use policy to limit shoreline development and protect agricultural land.

### PSD policy influence

The outcomes of the workshops fed into climate change adaptation policies in a number of different ways:

- some of the identified actions were included in the national climate change strategy;
- LBDCA changed its guidance for the evaluation of proposals for local development projects, so that any projects supported would fit with the short- and medium-term actions identified; and
- the workshop created additional pressure to move ahead with actions which had already been included in regional development plans but where implementation had been neglected, e.g. improving irrigation, reforestation, protecting agricultural lands.

## Benefits and challenges of participatory scenario development

Based on our experiences, PSD provides an opportunity to integrate development priorities and plans with adaptation needs to address climate change and climate variability. The key outcomes include:

- Identification of development priorities and actions that need to be accelerated, because they also increase capacities for adaptation (e.g. improving healthcare services in areas prone to diseases because of changing climate).
- Identification of on-going development programmes and actions dealing with current impacts that need to be intensified and applied to other regions facing similar impacts in the future (e.g. rainwater collection is often a small-scale initiative, but could be expanded in areas where reduced rainfall is expected).
- Encouraging thinking about the community's future and eliciting valuable knowl-

edge that local community members possess about climate change impacts and adaptation, even though those practices may not be explicitly recognised as helping to reduce vulnerability to climate change. Building on this familiarity helps to empower local communities and decision makers to engage in their communities' development, building resilience to climate change.

Several challenges exist when using PSD. One key challenge is to find ways of linking quantitative information about current trends and climate projections with qualitative scenarios, and transforming them into policies. Increased attention needs to be paid to maintaining the dialogue between researchers and community groups on the challenges and uncertainties of climate change projections and sharing information that can be used to advance adaptation and development despite existing uncertainties.

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