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Call for papers

# The opportunities and roles of experimentation in addressing climate change

***Transitions*** that reduce dependence on fossil carbon, that increase resilience and adaptive capacity and that help societies to make progress towards sustainability require innovative new solutions as well as policy development and improved governance. ***Experiments*** have emerged as a way of obtaining potentially new knowledge, practices, networks and iconic examples for local, national and even international climate and sustainability governance (Brown and Vergragt, 2008; Schot and Geels, 2008; Seyfang and Smith, 2007; Hoffmann, 2011; Bulkeley and Castán Broto, 2012; Bulkeley et al., 2012). So called natural experiments (Gerber Alan and Green Donald, 2008) have furthermore been seen as an improved way to demonstrate causal inference. An essential part of the new drive towards experimentation is evaluation that should inform learning and thereby contribute to a transition towards sustainable low or no-fossil-carbon and more resilient societies (IPCC WGII AR5 2014).

Experimentation as a driver of societal transitions has caught the attention researchers and governmental leaders. Experimenting is seen as a way of overcoming bureaucratic hurdles and other inertias on the routes towards more sustainable solutions. Experiments supporting sustainability transitions can be specified as 1) making something new and concrete, are 2) trials or tests in a restricted environment in terms of time, space, scope and/or actors and are 3) intended to provide proof of principle that subsequently has the potential of wider societal relevance through various upscaling mechanisms.

The objectives of this Special Volume (SV) of the Journal of Cleaner Production (JCLP) are based on the need to deepen our understanding of what experiments aiming at sustainability and climate change transitions can achieve. The SV will explore under what conditions they can fulfil the expectations they have raised and what stumbling blocks they may encounter, especially in the process of upscaling. The SV will, in particular, examine how and why experiments succeed or fail to contribute to wider transitions towards sustainability and climate challenges.

The first objective is to deepen our understanding of different types of experiments in the context of climate change and societal sustainability transitions. Relevant questions include: what experiments have been performed, who has initiated the experiments? The second objective is to obtain more and better descriptions of actual experiments. The third objective is to analyse the capacity of local experiments to outperform official policy goals and to initiate wider transitions towards sustainability beyond the local places where they have been originally carried out. Relevant questions include: how and through what mechanisms the experiments are replicated and scaled up? Which are the key mechanisms that drive these processes? The fourth objective is to contribute to the discussion on how policies and improved governance can facilitate the emergence of a 'culture of experimentation' for sustainability transitions. Relevant questions include how legal, economic and political circumstances favour or hinder experiments and how barriers to experimentation can be overcome.

## 1. Themes of the SV

Papers presented at the workshop of the COST-Action (IS1309) INOGOV Climate Change Policy and Governance: Initiation, Experimentation and Evaluation, 12–13 March 2015, Helsinki will be selected as candidates for this SV, and the authors of the selected papers will be invited to develop full peer review-ready documents according to the attached schedule. The authors of the selected papers will have time to improve and upgrade their workshop paper to a high quality journal article, which is peer review ready, according to the guidelines of the Journal of Cleaner Production. This Call for papers (CfPs) is also open to colleagues who did not attend the workshop but who have an interest in one or several of the following themes.

### *1.1. The characteristics of experiments supporting sustainability transitions*

As a phenomenon, experimentation can be analysed from different angles such as governance experimentation (Jowell, 2003; Sabel and Zeitlin, 2010), socio-technical experimentation as part of sustainability transitions focussed upon technological innovations and markets (Kemp et al., 1998; Schot and Geels, 2008) and as "living laboratories" taking place at a local level (Bulkeley and Castán Broto, 2012; Evans, 2011) or randomized social experiments, which emphasize the systematic experimental method (Greenberg and Robins, 1986).

It is important to strengthen our understanding of the diversity of experiments as this may affect expectations and demands that will be put upon them. Thus an iconic example is very different from a randomised experiment that aims at testing an incremental improvement, which differs from an experiment with a new type of policy that supports, for example, installations aiming at increased energy efficiency.

The papers under this theme are expected to provide new insights into how one can characterise experiments and how one can distinguish experiments from ordinary incremental development. Several experiments have been performed at the local level in urban settings (Castan Broto and Bulkeley, 2013), but there is a need to broaden our understanding of experiments with case analyses from different sectors and contexts. Papers can deal with, for

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example, local experiments that deploy novel solutions for sustainable energy production, transportation, food production, reduction of risks to climate change or broader policy level experiments that put in place new incentives for sustainability transitions. For example, the EU open method of coordination or the support for projects such as Mayors Adapt (http://mayors-adapt.eu/) can be seen as wider experiments in improved governance.

Topics under this theme include, but are not limited to:

- The ways of grouping or classifying experiments for sustainability transitions
- The emergence of experiments as a way of 'solving societal challenges'
- The motivation for experimenting in addressing climate change challenges
- Analyses of the driving forces behind experiments
- The design of experiments for climate change solutions at different levels
- Identifying the common denominators of experiments
- Descriptions of iconic experiments in different sectors and societal settings

### 1.2. Real world experiments

Pilot cases and experiments for enhancing sustainability and for meeting climate change challenges are proliferating (Davies et al., 2014). But to advance our understanding of experiments, there is a need for good systematic descriptions of experiments in different sectors and on different scales. Building on a theoretical framework (see Theme 1) papers under this theme are expected to provide in-depth analyses of specific experiments. To gain insights on which to build new experiments, studies are needed on successful, but in particular also failed experiments.

By providing examples of a wide range of different experiments, the papers under this theme will jointly illustrate the diversity of experimentation and provide material that can provide a background for deeper learning. It is important that the analysis of each contribution is based on clear framework and transparent method of analysis. Purely descriptive stories of cases will not be accepted.

Topics under this theme include, but are not limited to:

- Climate change and sustainability experiments in different sectors: actors, topics, modes of operation
- Long-term follow up of experiments – the internal dynamics of experiments – how do they evolve with time
- Failed experiments and the reasons behind their failures
- Measures of success of experiments
- The use of the sustainability and climate change experiments by different actors – setting an example, a distraction or a testing ground for genuinely new solutions?

### 1.3. The upscaling and diffusion of experiments

Experiments can be seen as strategic actions. The intention is to perform something on a limited scale in order to create leverage for broader and wider change that ultimately leads to a major societal transition towards sustainability. The mechanisms of these processes are not fully understood and there are likely to be many possible pathways. Theoretical work includes the Multi-level perspective (MLP) that sees change occurring through interaction between three different levels: the landscape, the socio-technical regime, and the niche(s) (e.g. Geels, 2005, 2011; Smith et al., 2010), with experimenting occurring in particular at the niche level. Transition Management highlights the importance of visioning before experimenting, and considers that facilitation of radical change towards more sustainable systems of production and consumption evolves through carefully designed processes that include problem structuring and vision development, agenda building, transition paths, operational-level experiments and projects, and the monitoring and evaluation of progress (Kemp et al., 2007).

The papers under this theme are expected to present or to critically examine appropriate theoretical frameworks for analysing the processes of diffusion and upscaling of experiments. They can also be specific studies of how the processes of diffusion and/or upscaling have unfolded, focussing on what can be learnt about factors favouring or hindering the upscaling or multiplication of successful experiments.

Topics under this theme include, but are not limited to:

- Theory vs practice in upscaling and diffusion of experiments
- Empirical analyses of crucial steps in upscaling and diffusion of experiments
- Success factors and stumbling blocks in diffusion and upscaling
- Upscaling vs multiplication in different types of experiments
- Diffusion of learning from experiments across different societal settings

### 1.4. Evaluating experiments

Local experiments that outperform official climate strategies or national top-down programmes for sustainable development are of particular interest because they suggest that the potential for change is greater than existing policies have admitted or recognised. For example, local experiments have demonstrated that it is possible to cut greenhouse gas emissions at a much quicker rate than what official policies and policy measures aspire to achieve. Experiments have demonstrated new types of solutions to the adaptation to climate change (Cloutier et al., 2014). Experimentation at higher levels of governance that create conditions and incentives for the emergence of novel solutions, are also of interest (Hildén, 2014).

The papers, under this theme, focus on what experiments have been able to deliver, how they have delivered and how one should evaluate experiments both with hindsight (ex post) and as prospective solutions to grand challenges (ex ante). The interest in evaluation reflects the opportunities for learning and general contributions to transitions towards a low-carbon (European Commission, 2011) and also sufficiently adapted societies (IPCC WGII AR5 SPM 2014).

Topics under this theme include, but are not limited to:

- New empirical and theoretical analyses of experiments that provide insights into their wider environmental effectiveness, and social and economic sustainability.
- Long-term monitoring of the outcomes of experiments and their side effects.
- Studies that critically examine the capacity of experiments to contribute to system level transitions.
- Methodological studies on how to evaluate different types of experiments at different levels of governance and different temporal and spatial scales.

### 1.5. The governance of experiments

Experiments do not emerge out of thin air. They are initiated by actors and societies in which they are performed provide incentives or constrain the possibilities for experimentation. Greenberg and Robins (1986) noted that the popularity of experimentation has varied in the US, with a declining interest in statistical rigorously

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