

## sDiv working group – Feedback of PIs

### “Understanding the undesirable resilience in socio-ecological systems driving biodiversity loss (sOcioLock-in)”

The sOcioLock-in working group was based on an interdisciplinary perspective to identify mechanisms that ‘lock-in’ socio-ecological systems to states which drive biodiversity declines. Discussions were focused on uncovering combinations of solutions that are more likely to be successful in ‘tipping’ systems to more sustainable states.

Throughout the events on February and June 2018, focal areas of discussion were around two main themes: 1. a conceptual approach for the advancement and application of undesirable resilience for sustainability and transformation science; 2. an empirical analysis of transformation archetypes in the global food system and their social and environmental outcomes. Participants’ presentations and discussions were around past research on resilience and undesirable resilience, undesirable resilience in socioecological systems from both the social sciences and ecology angles, lock-in mechanisms in food systems, potential quantitative methods for scoring and analyzing lock-in mechanisms, literature analysis of terms related to desirable and undesirable resilience across academic disciplines, potential case studies for application of conceptual advancements, and a concluding group meeting on future proposals to be developed. In parallel to the working group activities, a seminar on sustainable palm oil production was presented to the iDiv community and PIs conducted an iDiv public talk on the resilience in social-ecological systems: deconstructing the positive and dark side.

In contrast to previously expected outputs, completed and ongoing activities following the event considerably expanded and can be summarized below:

- **Manuscript 1** - Literature analysis (Dornelles *et al.* To ‘build resilience’ or to ‘unlock undesirable resilience’ in socio-ecological systems? Exploring competing narratives in the academic literature): draft to be submitted to *Global Sustainability* by early February 2019.

We designed this analysis as part of the second workshop. We believe it is the first study to quantify discrepancies in the study of ‘desirable’ and ‘undesirable’ attributes of systemic resilience from different disciplinary perspectives through analysis of published work in Web of Science and Scopus.

Main findings: terms related to ‘undesirable resilience’ are less frequently researched and academic publications occur within siloed disciplines. We argue that a more integrative cross-disciplinary approach to ‘unlock undesirable resilience’ could potentially benefit initiatives aiming to efficiently link resilience, sustainability and transformation. An expanded lens investigating lock-in mechanisms that explicitly and coherently addresses characteristics of reversibility and plausibility in socioecological systems may allow synergy in conceptual and methodological development in the applied sciences.

- **Manuscript 2** - Empirical analysis (Oliver *et al.* Transformation archetypes in the global food system and their social and environmental outcomes): draft.

Initial datasets of characteristics of food systems for three countries were collated before workshop 2 by Andre Dornelles. At the second workshop, half the participants split into an empirical analysis study group (the other half for the conceptual paper, see below). We discussed the data and decided against a detailed case study of three countries, but, rather, a more broad analysis of > 150 countries. Our aim was to understand how food systems are changing in order to efficiently target interventions to ‘unlock’ and leverage food systems into more sustainable states and to ‘lock-in’ positive trajectories. Results were presented back to the full group at the end of each break out session to help road-test and refine ideas.

Hypotheses developed at the workshop were: The global food system is highly dynamic. H1: Whilst countries diverge in key food systems structural metrics, this complexity can be reduced into several broad archetypes of food system transformation. H2- These transformation archetypes differ greatly in their negative local environmental and social impacts, in many cases compromising sustainability (i.e. constraining UNSDG achievement) H3- Food system transformation archetypes with lower local environmental and social impacts are often responsible for lock-ins to negative impacts in other countries.

- **Manuscript 3** - Conceptual paper (Boyd *et al.* Undesirable resilience: conceptual advances and applications for sustainability and transformation science): draft to be submitted to *Environmental Research Letters* or *Ecology and Society*.

This is a paper that was planned primarily by the second break out group with feedback from the workshop participants in plenary. The ultimate goal is two-fold. Firstly, to identify how 'undesirable' resilience is conceptualized in relation to sustainability transformations and secondly to explore how its application can leverage options, actions and tackle tradeoffs between SDGs (food/hunger, land, and climate).

To achieve sustainability requires starting with goal in mind and making normative judgments about what is good and bad, so we can identify, diagnose and overcome undesirable resilience preventing reaching the goal. Transformation research has the aim of fostering sustainability transitions, but it does not focus sufficiently on mechanisms to do so. Resilience research gives insight into mechanisms of change or stability. It also explains that change is a necessary and unavoidable part of development. Change is achieved in positive directions through systems buffering, anticipating, adapting and learning. The focus of our workshop discussions were on how resilience can also be understood as a negative - 'hand break' - manifest as entrenchment, resistance to change, or a bounce back to the status quo (e.g. poverty traps, capitalism eroding natural capital, institutions that uphold dysfunctional cultures, individuals stuck with negative mental models). We discussed ideas that 'undesirable' resilience serves as a useful concept to enable us to address connect across disciplines and opens up questions about: what are the mechanism that uphold unsustainable states in socio-environmental systems (or maladaptation in climate change), how are these mechanisms upheld, when and where and at what scale, and ultimately by whom for whom? We examine these questions through seminal cases from the literature.

- **Follow-on workshop at Lund for a (new) paper 4:**

Follow-on workshop will be mainly focused on writing paper 3, based at Lund University Centre for Sustainability Studies (LUCSUS) from 28 to 29 March 2019. Agenda is planned to be structured as: Session 1- Revisiting the framework, key concepts, question; Session 2 - Case studies (pre-determined prior to the workshop); Session 3 - Identification of the mechanisms; Session 4 - Assessment of scale, time and space; Session 5 - Mapping the role of actors; Final session 6 - Time plan and next step. Participants involved will be Professor Emily Boyd, André Dornelles, Izabela Delabre, and Genesis Tambang Yengoh.

- **Conference abstracts:**

Two abstracts arising from sOcioLock-in were approved for oral presentation for Leverage Points 2019, Leuphana, 6-8 February: 1. Boyd *et al.* Undesirable resilience: a constructive perspective for sustainability and transformation science; 2. Oliver *et al.* Overcoming undesirable resilience in the global food system.

- **Proposals submitted:**

Two proposals related to sOcioLock-in were submitted to: 1. Swedish Research Council (VR) - Unlocking undesirable resilience for sustainability transformations; 2. Global Alliance for the Future of Food - Systemic solutions for healthy food systems: The positive health benefits and impacts of sustainable food systems. Despite highly ranked and positive feedback among proposals submitted, neither were funded due to intense competition.

Organizers and participants collaborated through inspirational insights, cooperative spirit, and dedicated feedbacks during, between and after the two working groups. As PIs on behalf of all participants involved, we would like to extend our sincerest regards to sDiv support and captivating atmosphere responsible for making current and future work possible. Inspiration for our own work can be represented by activities described above, and we recognize the working group as a successful platform for 'leveraging' further academic collaborations and in 'tipping' the field to more sustainable trajectories.

Sincerely,

Professors Tom Oliver and Emily Boyd & Andre Dornelles