Social-Ecological Transformability

Subjects: Others

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Transformability is increasingly promoted as a way of moving societies toward more sustainable futures in the era of the Anthropocene, mostly because the concept of resilience has fallen short in many instances where impacts on social-ecological systems are continuous, varied, and usually unknown. While such transformations can play a crucial role in improving the sustainability of social-ecological systems, they may lead to unexpected and undesirable outcomes.

Social-ecological system | Resilience | Transformability | Social complexity | Uncertainty

1. Introduction

Transformability relates to the social-ecological capacities that enable shifts from one regime to new pathways and even to the creation of new systems. Transformability has been defined as “the capacity to create a fundamentally new system when ecological, economic, or social structures make the existing system untenable”[1] (p.1). It refers to the ability of the SES actors to cross thresholds and move systems into new paths of development [2][3][4].

In this era of the Anthropocene [5][6], change in social-ecological systems [7], whether or not it is intended, seems unavoidable. The state of social-ecological systems (SESs) is continuously changing, but during the lifespan of an individual, there is a strong need to maintain these systems in ways that are sustainable and familiar to each generation [8][9]. Resilience, i.e., the capacity of a system to persist and reorganize in the face of change [1][10][11][12], has been a central concept in the literature of the last 20 years. In this line of thinking, resilience theory is criticized by scholars due to the lack of analytical power available to study the shifts and fundamental changes in the structure and functioning of SESs, or in other words, the transformations[13][14][15]. Considering the increase in uncertainties and the interconnectedness of crises, as can currently be observed through global climate change, transformations are necessary to prevent SESs from collapsing[16][17][18]. However, “having the capacity” to seize the opportunity of change in order to redirect a system towards sustainability pathways is challenging [8]. Indeed, when implementing actions on the ground, the achieved outcomes are sometimes very different to what was expected or desired. Anticipating the repercussions of change when managing SESs is not an easy task due to the associated complexity and uncertainty surrounding SES dynamics [19][20]. For example, in biodiversity conservation, policies and incentives are known to generate unintended pervasive impacts [21].

Transformations are intrinsically pervaded by social complexity. They are the product of framing narratives and stakeholders’ perceptions of problems, processes of change, and the desirability of the alternative trajectories of the system [22][23][24][25]. Social-ecological transformations involve a plethora of stakeholders with varying levels of

power, whose values, interests, and goals are heterogeneous and often conflicting. Therefore, decisions about the pathway of change may suffer from myopia because of ambiguity and human limitations in information processing related to the formulation of both the problems and their solutions [26].

The mechanisms at the root of social-ecological transformations are not clearly identified and understood [24][27]. Hence, creating new trajectories for a system with any level of consensus and reliability remains difficult; because of the inherent complexity of the SESs and the uncertainties that they entail [28]. For instance, drivers and consequences of social actions may be intensified with retroaction and recursive loops, propelling the system outside of sustainable domains, even with cross-scale effects [29][30][31][32]. Surprises in SESs may also emerge without apparent warning [33][34].

As currently understood, transformability initiatives are candidates for creating wicked problems, i.e., intractable and boundary-spanning issues [35]. Some specific contexts of social complexity and uncertainty cause transformations to escalate from solving complex problems to creating wicked problems. Considering that transformations occur in dynamic open systems, the capacity to seize the opportunity of change to implement transformative actions is likely to be influenced by a myriad of different factors as such as: high complexity, uncertainty, deep conflicts, and scale mismatches.

2. Transformability: Between Theory and Practice

Transformation means creating new “stability landscapes” [1] by introducing new components and ways to make a living [16]. Thus, transformation processes refer to fundamental changes in the structure, function, and relations within SESs, which lead to new patterns of interactions (e.g., among actors, institutions, and between societies and ecological systems) and outcomes [36][37][38].

Transformation is conceptualized as a necessary step once ecological, economic, and/or social conditions render the SES untenable [39]. In this view, transformation is not necessarily a choice but rather the last phase before or during the system collapse [40], for example, in the context of a natural disaster. The transformation of the SES can be in response to the identification of tipping points or thresholds [3][41], or they could be driven by failures of past policies and actions, which make the system untenable or undesirable [27][42]. From this perspective, transformation is a deliberate initiative that intends to anticipate the redirection of the system onto a new path before structures make the existing system collapse [18].

SESs can sometimes be resilient but become trapped in undesirable situations such as the “poverty trap” [43][44], but the desirability of a system is human-centered. From an ecological perspective, Nelson et al. [3] argue that there is no presumption that one state is more desirable than another. Hence, social desires and goals serve as a point of comparison to evaluate the desirability of a given state, which can clearly raise controversies about the normative nature of such judgments of desirability as well as the responsibility of those who decide [18][24].

The untenable or undesirable situations of SESs and crises can be seen as opportunities for transformations, new ways of thinking, learning, and operating [16][45][46]. Indeed, a crisis can potentially be used productively to stimulate "safe-to-fail experimentation" [2][47], small-scale experiments, novelty, and learning within society [48][49] and with nature. For instance, in a study about a climate-related disaster in Honduras, McSweeney and Coomes [50] demonstrated how after Hurricane Mitch, the rural Tawahka community became mobilized and initiated institutional change that served to enhance social-ecological resilience and improve livelihood contributions to the poor. The crisis induced by Hurricane Mitch therefore opened up a window of opportunity to improve the community's capacity to cope with storms and flooding and thereby enhanced their long-term resilience to extreme events [50]. Despite the lack of consensus about the types of changes that would actually happen, at least three phases are known to occur during transformations (Figure 1)[42][46][51]. The first phase is preparing the system for imminent change and the second is navigating the transition into a new direction. These two phases tend to be linked by the "window of opportunity" for change [37][42][52]. The third phase is about building the resilience of the new pathway. Phase 1 is often protracted until a window of opportunity allows progress to phases 2 and 3 [46][49].

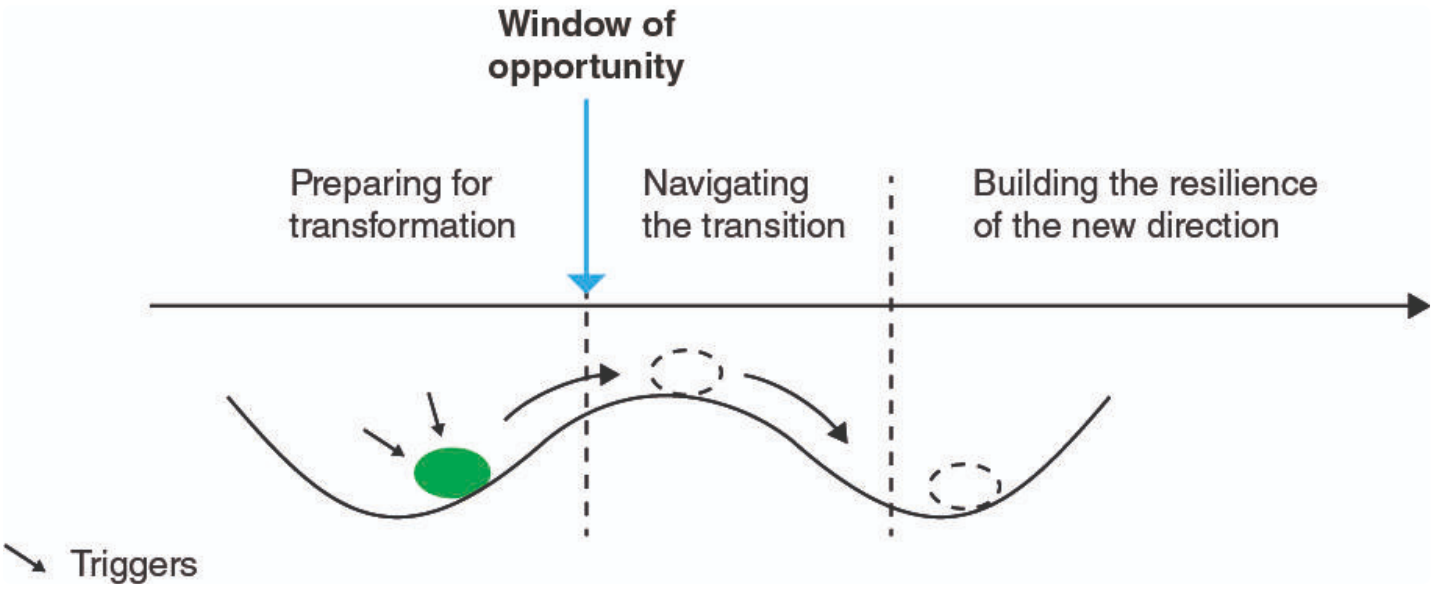

Figure 1. The three identified phases of social-ecological transformation processes (adapted from [46] (pp. 263-285), in Adaptive Capacity and Environmental Governance, edited by Armitage D., Plummer R. © Springer-Verlag Berlin Heidelberg 2010, with permission from Springer Nature).

The challenges highlighted here simply indicate that transformability is more difficult than is generally acknowledged because of the many social and ecological factors involved. Further, understanding and addressing the governance and societal challenges of social-ecological transformability is where further research might make a difference in terms of operationalizing opportunities for changes.

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