Case Studies in Sustainability — An Introduction

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1 Tackling Real-World Wicked Problems

Wicked problems are social and cultural problem that are difficult or impossible to solve for several reasons: Often knowledge is incomplete or contradictory. The number of people is large and the range of opinions is broad. The economic burden associated with progress towards a solution can be large. The interconnected nature of these problems with other problems adds to the complexity. All of this applies to the problems humanity's quest for sustainability poses to society. In particular, this is the case for efforts of making progress towards the Sustainable Development Goals (SDGs) of the United Nations' 2030 Agenda for Sustainable Development (United Nations, 2015): Knowledge on how to find pathways towards the SDGs is incomplete and contradicting (Jules-Plag & Plag, 2016). Reaching the SDGs even on a local level involves the whole of society (UNRISD, 2016). Making progress towards the goals requires a rethinking of economy (Utting, 2016). The goals are strongly interconnected and there are many interactions between the individual goals (e.g., Nilsson et al., 2016; Singh et al., 2018) that differ across different economic, social, and cultural settings (e.g., Jules-Plag & Plag, 2016). For example, addressing poverty is linked with education, nutrition, economy, health, and inequality, but the links depend on the cultural and economic setting.

One of the ten characteristics of wicked problems is that each problem is unique (Rittel & Webber, 1973). For example, poverty in California is grossly similar but discretely different from poverty in Angola, and there is no practical set of characteristics that defines poverty. This rules out to some extent to generalize solutions - which is what traditional disciplinary science aims at. However, by looking at case studies, we can learn about what has to be considered in other case studies and how progress was made to tackle a wicked problem.

There are in principle three different approaches to wicked problems: authoritative, competitive, and collaborative. In most cases, a collaborative and participatory approach has the biggest chance to lead to improvements, and success often depends on linking all relevant stakeholders as well as experts together. Wicked problems have - among others - the characteristic that there is disagreement about the problem definition and solution. Participatory modeling is one approach to the transdisciplinary nature of wicked problems, and it requires a transdisciplinary system of system approach. Super-wicked problems are those where the people who cause the problem want to solve it, and where we are running out of time. Prominent examples of superwicked problems are climate change, oceans and plastics, reaching the Sustainable Development Goals, cybersecurity, the food-water-energy nexus, the opioid crisis.

Having knowledge of case studies carried out in one place to address a wicked problem can inform efforts in other places and greatly support these efforts. *Case Studies in Sustainability* aims at creating a publishing and discussion forum that does this: It will provide scientific reports of case studies and, by doing so, connect the general public as well as decision and policy makers to experts with knowledge concerning the anatomy and physiology of the planetary life-support system and humanity's role and future in it and impacts on it.

Case Studies in Sustainability is urgently needed. Articles on wicked problems are distributed over a large range of disciplinary journals, with very few of them linking science and governance in a transdisciplinary way. Moreover, none of the existing journals combines the physiological view on the planet

and humanity embedded in the Earth's life-support system with the "wicked problem" concept. Aiming at this makes *Case Studies in Sustainability* a rather unique - and very timely - journal.

2 Mission and Scope

The mission of *Case Studies in Sustainability* is to create a publishing forum for the discussion of research on transdisciplinary approaches to sustainability-related problems. Nearly all of these problems are wicked problems. Importantly, each of these problems is unique and needs some level of transdisciplinary imagination to find interventions that can lead to a desirable future (Brown et al., 2010).

Because of the uniqueness, case studies are an important avenue for addressing these problems. The journal seeks to publish scientific participatory case studies from local to global scales in all areas of sustainability. Focus will be on the creation of use ready knowledge that can inform policy making and the development of system interventions for progress toward sustainability. Case studies that aim to facilitate progress towards the Sustainable Development Goals detailed in the United Nations 2030 Agenda for Sustainable Development are particularly welcomed. Invited review articles will consider similar case studies and extract generalized knowledge from these studies.

3 Uniqueness

There is an urgent need emphasized among others in several science-based warning to humanity to address the emerging Anthropocene Risks, which to a large extent appear to be global catastrophic risks (GCRs). Decision and policy makers at all levels from local to global are in need of use ready knowledge that can inform their decisions and the development of interventions that aid the governance of these risks. However, the traditional ways of science to communicate the scientific knowledge most often is not use ready and does not reach decision and policy makers in ways that would allow to translate this knowledge into decisions and policies. The journal aims to address this gap between science, creation of use ready knowledge and all sectors of society from government to business and private. Case studies of wicked problems related to sustainability that are addressed in a transdisciplinary collaborative approach have a documented high potential to create use ready knowledge, and if this knowledge is communicated in multiple ways aimed at different target audiences (scientists, policy, business, public) then the potentially high value of the public good of knowledge can be realized. The journal is unique in its aim to increase the value of scientific knowledge by making it accessible and usable, and by democratizing the knowledge.

4 Conceptual Framework

Modern society is a major player in the Earth's life-support system and modifies the physiology of this system at an unprecedented scale and pace. Homo sapiens have created a single-species high-energy pulse that has fundamental impacts on the anatomy and physiology of the life-support system (Plag, 2020). The evolution that brought Homo sapiens into this position is not yet fully understood. Whether the species will be able to assume a role that focuses on maintaining the system within a safe-operating space for the species and other species is not clear. The current interactions of humans with the biosphere on one side and the technosphere on the other is increasingly crossing the boundaries of this safe space, and it is not certain that technology embedded in a growth-focused mainstream economy will be able to compensate for the detrimental impacts of modern civilization on the planetary life-support system.

Societal decision and policy-making as well as human governance are not fully acknowledging the

challenges associated with the influence human communities have on the state and trends in the Earth's life-support system. Operating a planetary system and keeping it within a safe-operating space for humanity requires a deep understanding of the system as well as decision making that is informed by evidence and knowledge. The current state of the global system can only be fully understood from an outside view, in which the evolution of Homo sapiens is considered together with all other species and integrated into the overall system. Apparently, Homo sapiens is the first species that managed to remove many limitations for its growth (metabolic energy provision, predators, food shortage, limited dwellings, habitable environments, speed of travel, resource limitations, sicknesses) but it never developed the necessary ethics, social norms, and governance to limit its own growth.

The survival of human civilization, if not the human species, depends on the creation of knowledge that can inform planetary governance and stewardship, which ensures the safeguarding of the Earth's life support system, on which the present and all future generations of human and non-human animals depend. This puts science in a novel position and gives it existential relevance.

The new publishing forum provided by *Case Studies in Sustainability* will take a transdisciplinary approach to the wicked problems that managing a planetary life-support system poses to humanity and human governance. Each journal article will focus on a case study of a specific wicked problem and produce knowledge relevant to making progress in tackling this problem. Each case study will have to combine scientific knowledge of the planetary life-support system with an understanding of how ethics, social norms, economic principles, and human governance impact the anatomy and physiology of this system. While being based on case studies of current problems, some of the articles will also address basic science related to the physiology of planetary systems and subsystems as well as the evolution of species, including Homo sapiens. The *Case Studies in Sustainability* is also a forum for the publishing of high-quality case study reports produced by students in case studies of real-world wicked problems.

Two main strategies for reaching sustainability include consuming nature's flows while conserving the stocks (that is, to live off the 'interest' while conserving natural capital), and increasing society's stocks (human resources, civil institutions) and limit the flow of materials and energy (Brown et al., 2005). Importantly, the articles published in *Case Studies in Sustainability* will have to emphasize the relevance of flows in the Earth system (water, energy, carbon, nutrients, mineral resources, products, traffic, waste, people, birds, information, ... anything that moves) and how these flows and their changes impact the trajectory of the integrated Earth-human system.

5 Business Considerations

5.1 Editorial Board

The Editorial Board of *Case Studies in Sustainability* has an Editor-in-Chief and up to five regional Associate Editors who represent continental-scale regions. The process of identifying Associate Editors is in progress.

5.2 Business Model

The *Case Studies in Sustainability* Journal accepts articles relevant for transdisciplinary case studies of wicked problems in society related to sustainability and tackling the great challenges humanity has created for itself. The journal will access the six different types of articles summarized in Table 1.

Case study reports to be published are expected to:

- derived from specific case studies;
- use systems thinking;

Table 1. Types of articles accepted by *Case Studies in Sustainability*. Costs are given in USD and are for final publication of accepted articles.

Type	Description	Cost
Case Study Report	Reports of case studies of wicked problem	250
Original Research	Research on the methodology of tackling wicked problems	400
Review	Reviews of literature on the methodology and/or case studies of specific wicked problems	200
Conceptual	Conceptual considerations on tackling wicked problems	400
Opinion	Opinions on specific wicked problems and/or specific case studies	100
Student Case Study Report	Reports produced by students in case studies of real-world wicked problems	0

- be transdisciplinary; and
- identify the strategy (authoritative, competitive, collaborative); and
- provide use ready knowledge.

The journal also accepts original research articles, review articles, conceptual papers, and opinion papers on wicked problems and the methodology of tackling such problems.

5.3 Peer-Reviewing

All submitted manuscripts will be peer-reviewed. For the first four types listed in Table 1 a manuscript will be peer-reviewed by at least three reviewers representing science, government, and society. Opinion papers and student case study reports will be reviewed by one of the editors.

In parallel to the peer-reviewing, all manuscripts will be opened for a public (online) hearing. The reviews and contributions for public hearing are included in the publication. (Short) discussion articles can be submitted for each article in review or published.

The reviewing process is expected to create a virtual collaborative community around case studies of wicked problems. Benefits of being in this community include:

- early information on submitted articles;
- invitations to public hearing;
- participation in discussion forums;
- information on published articles;

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