

Achieving transformational change in land use and climate change¹

More inclusive and collaborative science is needed

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Key messages

- “Transformational change” is needed for meeting ambitious 2030 climate mitigation, sustainability and development goals. Definitions of transformational change in scientific and grey literature have the following in common: (i) movement away from the current status, opening new pathways; (ii) sustained change, through institutionalization or deep changes; (iii) focus on root causes; and (iv) harnessing knowledge and learning.
- Depth, speed and scale are three dimensions of transformational change. Four types of drivers of transformational change: Processes, Resources, Norms, and Legitimacy. Empirical examination on these drivers’ efficacy is urgently needed.
- The scientific literature is dominated by authors in high-income countries and rarely results from large collaborative efforts. This is in contrast with the drivers of transformational change that the literature itself has identified: inclusiveness, collaboration and cross-learning.
- Specific research is needed on transformational change in land use and climate change, drawing on rich insights from health, education and business sectors.
- Scientific knowledge and practical needs must be reconciled, e.g., by providing guidelines and tools for monitoring and evaluation, programme and project management, and financing mechanisms adapted to complex, multilevel and long-term, ‘transformational’ endeavours.

Introduction

Swift, deep and global action is required to face today’s environmental and climate challenges. Climate change must be kept far below the current global warming trajectory of 2.7 degrees projected by a UNFCCC (2021) analysis of 191 countries’ NDC re-submissions in 2021. Truly ‘transformational’ change and ‘paradigm shifts’ are needed to bring these sweeping changes by 2030, just nine years from now. Evidence is rapidly mounting that this herculean task is essential for humanity’s survival. There is additional moral and ethical pressure to address large and widening inequalities in income, livelihoods, human health, and access to food.

There is confusion of the meaning of transformational change in the context of climate change. Practitioners (e.g., policy makers, project proponents, donors, development agencies) want to know if and how their actions are or can be transformational. Scientists have been providing insights for specific contexts and have collectively chipped away at the TC concept from various angles. In climate change, it is unclear if scientific knowledge has sufficiently answered the practical question of HOW to make transformational changes happen.

This infobrief summarizes results from analyzing scientific articles across all fields of studies to answer three main questions: (i) What is the state of science in

1 This information brief reflects on the findings presented in this technical paper: <https://www.fao.org/3/cb7314en/cb7314en.pdf>

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transformational change? (ii) What does 'transformational change' mean? (iii) What could drive transformational changes? We focus mainly on transformations needed in the land use sectors (e.g., agriculture, forestry) because of their importance in both adapting to and mitigating the effects of climate change.

This study is part of a collaboration between FAO and CIFOR that started in 2017 to bridge the gap between science and practitioners (Atmadja et al., 2021). By answering these questions, we hope to identify gaps and extract patterns, and use science to inform future research, funding priorities, program design, and public discourse. To capture the state-of-the-art in theoretical and analytical thinking on TC, we used - in the Web of Science scientific literature database - a keyword search on "transformational change" in the titles of articles published between January 2000 and September 2018. The resulting 111 articles were characterized according to authorship and field of research. A subset of 20 articles was selected based on their subject matter (forestry, agriculture, ecology or climate change) and analyzed for definitions of TC and drivers of TC1. We also summarize definitions from a few selected institutions such as World Bank, Climate Investment Fund (CIF), Green Climate Fund (GCF), Food and Agriculture Organization (UNFAO), and UN Development Programme (UNDP).

Findings

State of science in transformational change

Literature on transformational change in land use and climate change is still scarce. Lessons must draw from other sectors. Of the 111 papers identified, 20 were related to land use and climate change (LUCC). In forestry, the literature is mostly related to reducing emissions from deforestation and forest degradation (REDD+). Transformational change is reasonably well articulated and analysed in the health, education and business management literature.

The distribution of co-authorship in the TC literature is dominated by authors in high-income countries.

Most (129 of 166) contributing authors were from 19

high-income countries (See Figure 1). Four countries (United States of America, United Kingdom, Australia and Canada) account for 61% of the authorship in the studied publications. In contrast, 16 low and low-middle income countries account for 9% of the authorship. We conclude the science of TC has not adequately reflected the voice of authors in developing countries.

While speaking of collaboration, most TC research has not been done collaboratively.

Very few publications come from collaborative efforts and are mostly (58%) produced by 1 or 2 authors. Two papers stand out, as they are in fields related to LUCC, written by numerous authors based in institutions in developing countries (Brockhaus et al., 2017; Mapfumo et al., 2017). Authors of these two articles represent nearly all the developing country authors involved in studying TC in LUCC.

In LUCC, two theoretical frameworks are prominently used in the transformational change literature: Transitions Management (TM) and the institutions, interests, information and ideas (4I) Framework. They are complementary as the TM offers concrete 'how-to' guidelines (e.g., Loorbach, 2010), while the 4I framework focuses on the political economy of change (see Brockhaus & Angelsen, 2012). TM was developed for a wide range of sustainability issues, rooted in the transition sustainability literature and builds on the science of complexity. The 4I framework was developed based on experiences in the forestry sector for a more effective, efficient and equitable implementation of REDD+. The 4I framework led to several research tools that can be used to conduct and compare case studies from different countries, and a range of analysis on the political economy of TC in REDD+ in many developing countries (see <https://www2.cifor.org/gcs/modules/redd-policies/methods/>).

Definitions of Transformational Change

Definitions of transformational change in the scientific and grey literature have the following in common:

- Transformational change represents a movement **away from the current status**, business-as-usual regime or behaviour, and an opening of new pathways;

1 A detailed explanation of our methods, and the list of analyzed articles are available in Atmadja et al. 2020

- The **transformations should be sustained**, either through institutionalization within systems, or changes in behaviour, cultures, beliefs, and power relations;
- Transformational action should **focus on root causes** and on **relationships between dimensions of change** (e.g. organizations, markets, technologies, power and social relations, and ideas);
- **Knowledge** and learning are drivers and indicators of change.

TC success in the context of climate change is indicated by deep, fast and large-scale changes, but achieving transformations in these three dimensions simultaneously is difficult. The inherent trade-offs between them make it difficult to achieve the simultaneously (Termeer et al., 2017). For example, deep changes cannot happen quickly and across a large scale. Given these trade-offs, aspiring for two out of the three indicators of success would be more realistic.

Some definitions diverge from each other. That is OK. Divergence may be due to the diverse goals and contexts that require diverse definitions. Or, there is an underlying disagreement of what is transformational and how it is achieved for any goal or context. Given the diversity of the literature examined, it is difficult to ascertain the reason for divergence. Definitions can diverge on how transformational change can be achieved (e.g., continuous/incremental vs. discontinuous or disruptive changes), focus on driver of change (e.g., actions or investments vs. process), or the scale being emphasized (national or large-scale change vs. changes across scales).

Possible drivers of transformational change

Four groups of drivers of TC emerged from the literature review, which can guide decisions on investments, approaches.

1. **Resources:** Factors that provide the needed inputs to push for a desired change. Example: information/data, knowledgeable people, funds, dedicated people, time, legal frameworks, market structures, institutions, political will.
2. **Legitimacy:** factors that help the desired change to be accepted by society at large as an objective that merits allocation of resources. For example: formation of higher-level agenda, shared concern,

economic and political interests, shared narratives, shared vision, heightened awareness.

3. **Processes:** actions that harmonize efforts and values across different levels and actors, and define a desired change. For example: forming a shared vision, collective learning, updating strategies and objectives based on evidence, harmonizing processes and incentives with vision, forming a transitions arena, linking and developing actors' alliances in different scales and interests, knowledge management, monitoring and evaluation, scaling up.
4. **Norms:** values that guide processes to result in sustainable and transformational collaborations. For example, openness to new ideas and actors, equal voice, risk-taking, willingness to empower marginal actors, willingness to learn and share lessons from trial and error, low/no-regrets approach (actions that would be desirable regardless of climate outcomes), and a focus on process.

The relative importance of drivers of TC is very contextual and depends on how TC objectives are defined. This means a driver of TC in one case may not drive TC in another. The objectives can be expressed in terms of barriers that need to be overcome, ideologies or norms that need to be propagated, paradigms that need to be shifted, or behaviours that need to be changed or incentivized.

Drivers and outcomes of TC are not easy to quantify and monitor. Scientific articles use a wide range of indicators for assessing and monitoring transformational change. We identified indicators related to a wide range of drivers (resources, legitimacy, processes, and norms). Some indicators are level-dependent (i.e., they only apply to outcomes at one level), level-independent (i.e., apply to outcomes at multiple levels) and multi-level (i.e., apply to interactions across levels). Indicators can be difficult or costly to apply across time or geographies and hard to quantify.

The area of business management offers practical insights into institutional transformation, although not all lessons are applicable due to the more complex types of stakeholders, objectives, visions, time frames, and constraints in LUCC. The business management literature offers the needed 'how to' that is lacking in TC literature in LUCC, such as how to cultivate leaders and an organizational culture that enables transformational change. The business management literature focuses on

TC at the enterprise and smaller units, making its findings useful for ministries, programmes, projects, departments, communities or individuals. Increasingly, articles go beyond profit-maximization into social and environmental sustainability. Nonetheless, the business literature lacks guidance for very long-term and global level transformations relevant to addressing climate change.

Transformational change is driven by norms and processes that can either be aligned to or have tradeoffs with human rights. Issues of rights are associated with the depth of change and could be jeopardized when seeking quick change at scale. The literature on transformational change generally supports local ownership in the change process but has differing definitions for, or does not define, 'local ownership'. There could also be trade-offs. For example, transformational changes may need processes and norms that are aligned with human rights, such as participation and inclusiveness. At the same time, taking risks and making deep changes may threaten human rights depending on the local context. The scientific literature has not explored these trade-offs adequately.

Recommendations

Relying on insights from other areas of social activity (business, education, etc.) will not be enough to address transformational change in LUCC. More specific research is needed. Several characteristics of TC are unique to LUCC and hinder a direct application of findings from other areas:

- There are no debates on the importance of health, education, public administration or business in society, but the case for forests and climate action still needs to be made for many parts of society.
- In particular, land tenure is of utmost importance in LUCC, but not in other sciences.
- The belief in human agency (that humans can be agents of change that can influence outcomes) over natural systems such as forests and landscapes is weaker than related to human systems such as health, education, public administration and business systems.
- Time scales to change are much longer in forestry and climate change. Typical project cycles of 2-5 years are too short to bring lasting impact.

- Power relations and actors that need to be involved in LUCC are different.

The political economy and human rights issues related to transformational changes need to be analysed more deeply and widely. Political economy questions such as who is defining TC objectives, who is included and excluded from discussions about TC, and for whom the change is, have not been adequately analysed. Such studies have been conducted, for example, in the context of REDD+ at national levels but need to be expanded to include more levels (global to local, multi-level interactions), geographies, contexts and perspectives, and they are similarly important for initiatives such as restoration, nature-based solutions and so forth.

TC research should be done more collaboratively. Fruitful scientific collaborations could be forged across disciplines, actor types (e.g., science, policymakers, community representatives, project proponents) and geographies.

Knowledge generated from scientific exploration of TC needs to speak to the needs and realities of developing countries. Engaging more scientists and non-scientific actors from developing countries could be one way to ensure that scientific knowledge incorporates a vision of change that is aligned with the needs and conditions of developing countries.

Scientists and practitioners need to work together to improve monitoring, evaluation and learning systems. Current systems, often narrowly defined to address carbon monitoring, need to address the complexity of monitoring multi-level, multi-actor changes across TC drivers and outcomes (such as resilience) that are not easy to measure and quantify. Monitoring needs go beyond outcomes and include 'fuzzy' aspects along the transformation pathways, related to processes, norms, legitimacy, resources. Indicators of transformational change are often either not quantifiable, or difficult to measure, or not easy to be measured consistently across levels, space and time. This makes it difficult to integrate transformational change aspects into current monitoring and evaluation practices still focused on measurability. However, monitoring will be essential to assess progress and learn from mistakes.

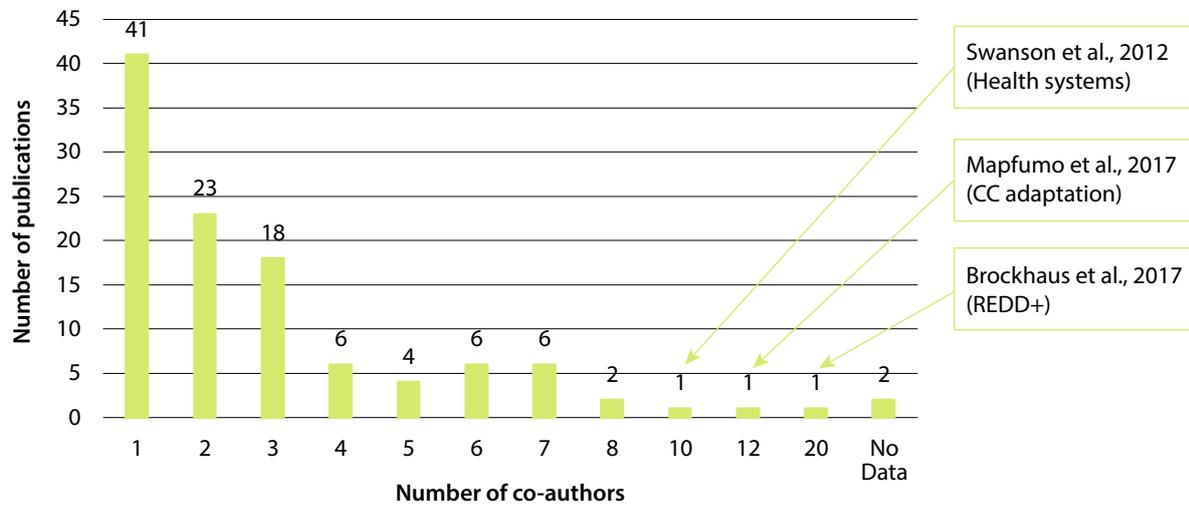


Figure 1. Number of co-authors per publication

Note: As of 31 December 2018; observations=111. Two publications had no data because the authors were listed as 'Anonymous'.

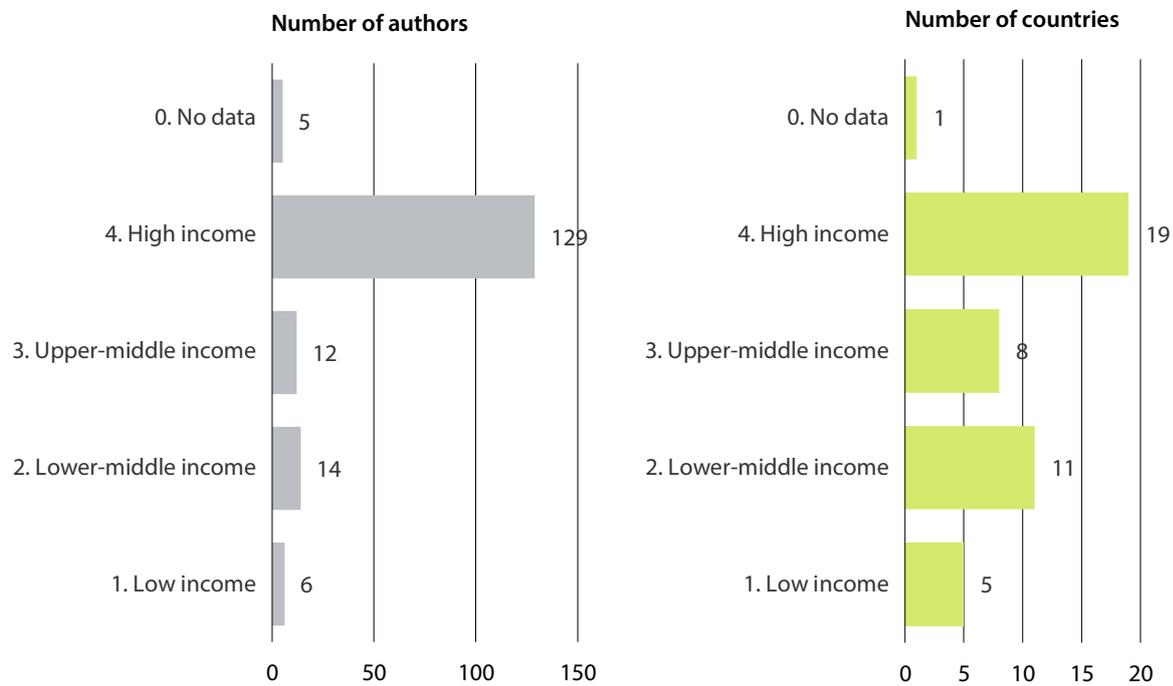


Figure 2. Number of authors by country income classification

Note: Total number of authors: 166; Total number of countries: 44. Country income classification taken from <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>, accessed 15 Sept 2020. Countries represent the author's affiliation, not their citizenship.

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