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6. Between social and planetary boundaries: Navigating pathways in the safe and just space for humanity

by
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Rapid environmental change in the face of enduring poverty and social inequality has brought unprecedented attention to the challenge of achieving social equity and environmental sustainability, at all levels from the local to the global. There is a clear need for conceptual approaches that enable these challenges to be addressed together, so that options for pathways to equitable and sustainable development can be identified and debated. The concept of social and planetary boundaries, integrated with the three "Ds" agenda – direction, diversity and distribution – provides one such framework. This can be used to identify alternative pathways and inform consideration of their social and political implications.

Planetary boundaries

The concept of planetary boundaries proposes that there is a set of critical Earth system processes – such as climate regulation, the freshwater cycle and the nitrogen cycle – which, together, maintain the planet in Holocene-like conditions. This preserves a "safe operating space for humanity", given that the Holocene is the only era in the planet's history in which it is known that humanity can thrive (Rockström et al., 2009). Identifying these critical Earth system processes, understanding their dynamic interactions at local, regional and global scales, and proposing boundary levels that avoid key "tipping points", or biophysical thresholds, is an ongoing process, based on advancing our understanding of the interacting dynamics of environmental processes in the Earth system.

Initial proposals for where the boundary levels should be placed indicate that humanity's use of natural resources is putting significant and increasing pressure on many of them. Three are estimated to have been exceeded – for climate change, biodiversity loss, and nitrogen and phosphorus use – increasing the risk of unprecedented ecological turbulence (Rockström et al., 2009; Carpenter and Bennett, 2011).

Complementary social boundaries

Planetary boundaries propose the outer limits of pressure that humanity should place on critical Earth systems in order to protect human well-being. Yet at the same time, human well-being also depends upon each person having access to the resources needed to meet their human rights, such as food, water, health and energy. Just as there are planetary boundaries beyond which lies environmental degradation that is dangerous for humanity, so too there are social boundaries below which lie resource deprivations that endanger human well-being (Raworth, 2012). Both kinds of boundaries draw on objective and subjective criteria. Planetary boundaries aim to avoid biophysical thresholds which can be objectively measured, but the process of setting the boundaries involves judgements about what constitutes an acceptable risk. Some social boundaries aim to avoid human biological thresholds (such as malnutrition, dehydration and death) which can likewise be objectively measured, but the process of setting these and other social boundaries also involves judgements about what constitute acceptable human outcomes.

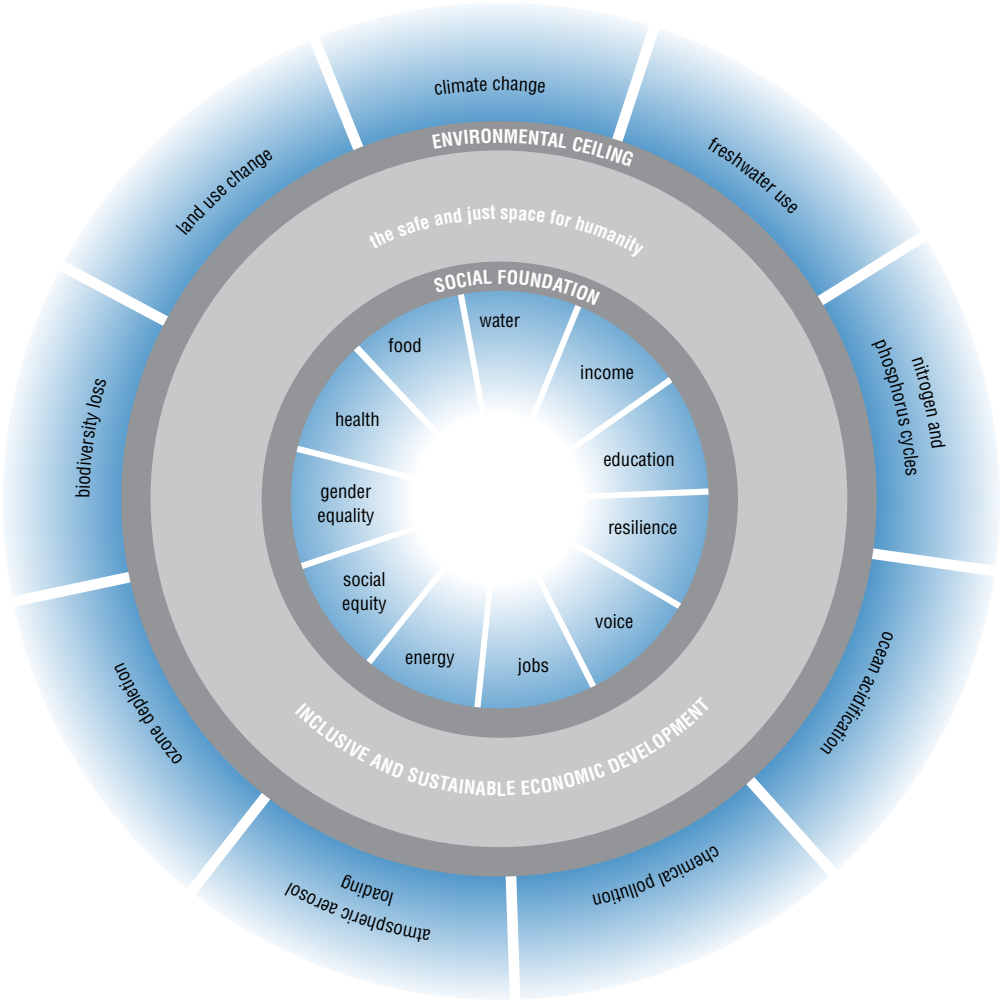
The 11 social boundaries proposed below are illustrative. They are based on the social issues raised as priorities in more than half of all government submissions to the United Nations Rio+20 Conference on Sustainable Development in June 2012. Internationally comparable data indicate that humanity is falling far below this social foundation. Nearly 13% of people are undernourished; 19% have no access to electricity; and 21% live on less than USD 1.25 per day (FAO, n.d.; IEA, 2011; Chen and Ravallion, 2008).

Combining the inner limits of social boundaries and the outer limits of planetary boundaries in this way creates a doughnut-shaped space within which all of humanity can thrive by pursuing a range of possible pathways that could deliver inclusive and sustainable development (see Figure 6.1).

This framework makes clear one of humanity's major challenges in the 21st century: to ensure that the use of Earth's resources achieves the human rights of all – 7 billion people, rising to at least 9 billion – while simultaneously ensuring that the total pressure on Earth systems remains within planetary boundaries.

The framework can be adapted and explored on local, national, regional and global scales. It invites further research into understanding how geographic scales and social contexts interact; better understanding the complex dynamics and feedbacks across and between the various planetary and social boundaries; and exploring the social inequalities and power relations that leave many millions of people without the essential resources they need, while allowing excessive resource use by others to push humanity across planetary boundaries.

Figure 6.1. **Social and planetary boundaries**

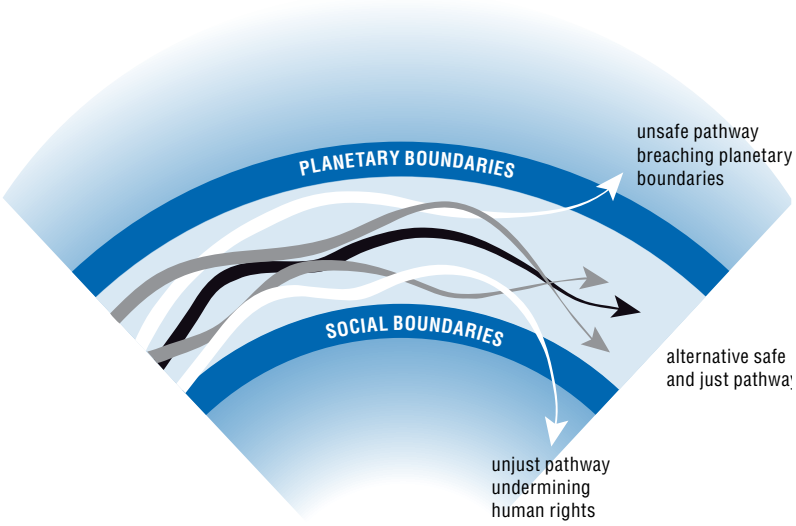


Source: K. Raworth (2012), "A safe and just space for humanity: Can we live within the doughnut?" discussion paper, Oxfam, Oxford, based on J. Rockström et al. (2009), "A safe operating space for humanity", *Nature*, Vol. 461, pp. 472-475.

Negotiating pathways within the safe and just space for humanity

This framework aims to specify the social and planetary boundaries between which humanity can thrive, but does not suggest specific pathways for getting into that safe and just space, or for thriving there. The precise configuration of the space will depend on the scale and boundary definitions chosen. There are likely to be many possible pathways in that space, which will be aligned with different cultures, visions and values, and with different costs, risks, and distributions of power and benefits between social groups. So there will be a range of outcomes for social justice. This makes the process of adjudicating between them a deeply political one (see Figure 6.2).

Figure 6.2. **Possibilities within the safe and just space**



Note: graphic design by Lisa Dittmar.

Take a particular challenge: ensuring the right to food for all within global and regional boundaries of climate change, land use change, biodiversity loss and nitrogen use. Proposals for meeting this challenge include raising the productivity of small-scale food producers; promoting agro-ecological techniques that sequester carbon in soils; promoting large-scale, input-intensive industrial agriculture; creating high-yielding, pest-resilient, genetically modified crop varieties; and a variety of other possible approaches. Such alternative pathways involve different actors, interests and values, and imply significantly different winners and losers, opportunities and risks. Some are compatible and could be pursued together, but others involve clear choices and trade-offs.

In adjudicating between such alternative pathways within the safe and just space for humanity, three questions or principles – described by the three "Ds" of direction, diversity and distribution – can help ensure that sustainable development challenges are met in ways that are compatible with social justice (Leach, Scoones and Stirling, 2010; STEPS Centre, 2010). These can be applied to any sustainability challenge or geographical scale, or used to explore the linkages and trade-offs between them.

The first D asks in which **directions** different current and potential pathways are heading. Is a particular pathway moving in the space between the boundaries, or veering towards either of them – or perhaps it has already moved outside them? What directions do other possible pathways offer? Being clear about directions brings attention to the goals, values, interests, behaviours, practices and power relations driving particular pathways. What would it take to "re-steer" pathways heading outside the safe and just space, and to support those steering within it?

Second, is there a sufficient **diversity** of approaches? Is a wide enough range of approaches being explored and tried out to ensure that at least one of them offers a promising way forward in any particular context? Fostering many solutions through diversity helps provide respect for and response to the values and needs of different people and places. Nurturing a diversity of possible pathways is also valuable because of

the uncertainties and surprises that complex environmental and social processes bring, keeping several options open in case some should prove infeasible.

Third, what are the implications for **distribution**? Who stands to gain or lose from the current or proposed pathway, or from the alternatives? Who is likely to benefit from a particular pathway in terms of resource access, well-being or power – and who will bear responsibility for the associated costs and risks? This involves asking how a choice between different pathways will affect inequalities in wealth, power, resource use and opportunity, regardless of whether those inequalities are vertical (across income groups) or horizontal (across social groups defined by factors such as gender, ethnicity, class and location). Clarity about the distributional implications is essential, as it is the basis for identifying pathways and choices that promote social justice and enable a more equitable sharing of the safe and just operating space.

Integrating these three Ds highlights the point that inclusive and sustainable development within social and planetary boundaries requires exploration of and debate about which combinations of pathways to pursue at different scales. Such debates will need to be as open and inclusive as possible, giving voice to the knowledge, values and priorities of women and men who are marginalised, so that they are able to challenge powerful groups and interests.

Rising to the challenge

To meet these challenges, a strengthened interdisciplinary, inclusive and politically astute science of sustainability and sustainable development is needed. Depending on the particular issue and context, it will be important to bring together social and natural scientists from different fields. But this new science would also be vitally enriched by the knowledge and expertise of citizens, resource users, policymakers and practitioners. The framework outlined here offers a shared set of concepts and guiding questions around which such interdisciplinary, science-policy-practice debate might happen, in order to explore and build pathways towards genuinely sustainable and equitable development.

What roles might social scientists play in fostering such approaches? The roles and tasks are many. They range from characterising actors, systems, boundaries and pathways, to understanding the political, behavioural and power-knowledge processes that shape current directions and distributional outcomes and their related social inequalities and injustices. Their findings might help re-steer and diversify these outcomes. This involves working across disciplines, as well as engagement between research, action and policy. This means moving beyond simply producing knowledge for instrumental purposes, whether to inform and solve puzzles for academic audiences, or to solve problems for policymakers, practitioners or groups of activists. As our approach emphasises, reflexivity and dialogue about goals and values are also central (Leach et al., 2012). This points to the importance of reflexive knowledge-making which engages critically with the assumptions of science and social science, and which communicates with the wider public sphere.

A new interdisciplinary science for sustainability needs to encompass all these concerns, and move nimbly amongst them. It needs to recognise sustainability as political, requiring inclusive debate and multiple voices. Seen in this way, science and knowledge-making become integral to wider conceptions of society and democracy; and a politics of sustainability is necessarily a politics of knowledge in which our own research, engagements and communications are deeply implicated.

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