

Earth System Challenges and A Multi-layered Approach for the Sustainable Development Goals

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Highlights:

1. The Earth system has entered a new phase in which human actions are threatening the planet's life support systems and drawing down the planet's natural capital in an unsustainable manner. It is essential that the Sustainable Development Goals (SDGs) reconfirm the commitments of the Millennium Development Goals (MDGs) focused on human wellbeing by alleviating poverty, enhancing food and water security, and improving health. But the SDGs must also address issues of Earth system governance and the challenge of redirecting unsustainable practices of individuals, groups, and countries worldwide.
2. The way forward is to adopt a multi-layered approach encompassing:
 - ◆ Global goals to maintain planetary scale processes in a safe, just and sustainable space.
 - ◆ Individual goals and targets framed in such a way that they can serve as focal points for a wide range of stakeholders.
 - ◆ Targets framed in global terms but - where possible and relevant - tailored at regional, national, local, or corporate/organizational levels to provide a menu of options allowing actors with different needs and capabilities to select those best suited for them.
 - ◆ Indicators and monitoring capabilities with the capacity to track change and report on progress.
3. The formulation of the SDGs offers rich opportunities to bridge gaps among sectoral silos by framing goals that are cross-cutting and integrative in nature and, if achieved, meet current needs articulated in the MDGs while ensuring that future generations can meet their own needs continuously. A well-designed performance review system, such as a "Global Sustainable Development Report" and comparable reporting mechanisms at the national level, and roles given to actors beyond national states will be essential, given the complexity of the agenda and the need for accountable implementation. For the review of SDGs, one new dimension needed is to include monitoring the key aspects of Earth system transformation.



New Challenges

The formulation and implementation of the Sustainable Development Goals (SDGs) must reflect the sustainability challenges of our globalized and interconnected world. They need to take into account economic, social and ecological domains and how they overlap and interact, whereas the Millennium Development Goals (MDGs) established mainly aspirations for addressing socio-economic issues. Insights from global change science over the last 20 years (LaPorte 1975; Simon 1981; Clark and Munn 1986; Stern, Young, & Druckman 1992; Taleb 2012) have suggested that major issues of public concern are increasingly connected in terms of scale and scope. The problems that emerge from sector-specific activities in one country can cause problems in functionally disconnected sectors in other countries. Governments and governance systems are typically poorly equipped to anticipate or respond to challenges of this nature, or to the attendant consequences that may follow. Coupled with these unprecedented changes in the nature of the challenges to global governance is a more hopeful trend involving an increasing number of actors responsible for dealing with such issues and who are generating new ideas for their management. The challenge of the SDGs is to respond effectively to these challenges and changes, providing appropriate goals and targets to guide behavioral change toward sustainable development.

Making Development Sustainable

In explicitly adding the label "sustainable" to "development," the Rio+20 Conference acknowledged that future progress in meeting human needs and aspirations requires a strong commitment to safeguarding the Earth's life support systems. The achievement of sustainable development on a planetary scale requires a redoubled effort to attend to the needs of the Earth's bottom billion. But in a world of 7 billion people, expected to increase to 9-10 billion in the coming decades, achieving sustainability will require redefining what many individuals and societies believe is the good life. Eradicating poverty can bring substantial benefits to societies, but doing so in a sustainable way demands a significant decrease in material consumption in wealthy communities and nations and throughout the emerging global middle class. A new perspective on the management of human-environment relations is also urgently needed.

In a summary of two decades of research on global change, the leaders of the International Geosphere-Biosphere Program observed that human activities

have become "...equal to some of the great forces of nature in their extent and impact" (Steffen et al. 2004). As a consequence, they noted, the Earth system is now operating in "a no-analogue state," meaning that previous experience may not provide a reliable guide to the future. This new global reality presents us with a series of unprecedented challenges that must be confronted in all efforts to achieve sustainable development. The pursuit of sustainable development must be guided by improved means of managing or steering individual and collective human behavior, which will determine the fate of the planet, social welfare, and human wellbeing. Some recently proposed redefinitions of sustainability (e.g. Griggs et al., 2013) explicitly include the protection of Earth's life-support systems as a defining characteristic.

All this means that we must think and act at multiple levels of governance simultaneously. There is no way to secure a sustainable future for isolated places on a planet in which both biophysical and socioeconomic processes are tightly interwoven. We must find a way to connect the "global" and the "local." Establishment of the SDGs is an opportunity to provide a strategic pathway to achieve this objective.

Implications for the Design of SDGs

The outcome document from the Rio+20 Conference states that the "...SDGs should be action-oriented, concise and easy to communicate, limited in number, aspirational, global in nature and universally applicable to all countries while taking into account different national realities, capacities and levels of development and respecting national policies and priorities" (UN 2012, paragraph 247). This is a demanding yet essential list of requirements. We must frame goals for sustainable development in such a way that they consider the fundamental changes in the Earth system caused by human activities. At the same time, goals addressing human needs must continue to be emphasized including: eradication of poverty, food and water security, human health, and enhancing the quality of human life. Specifically, we offer the following suggestions:

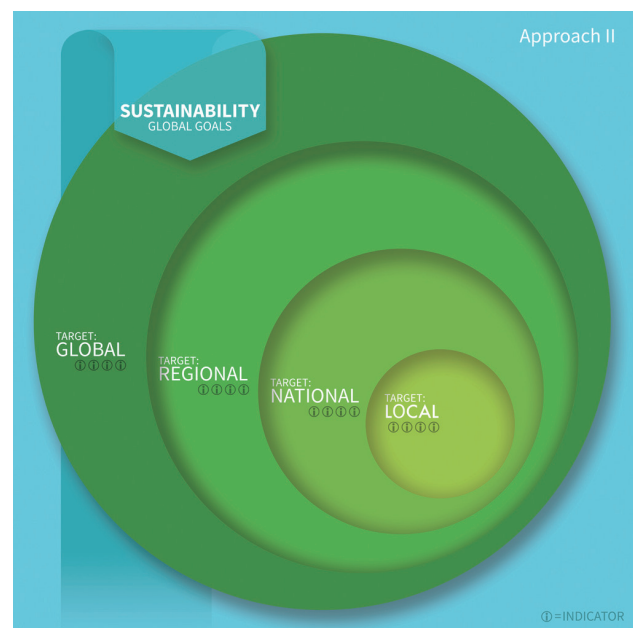
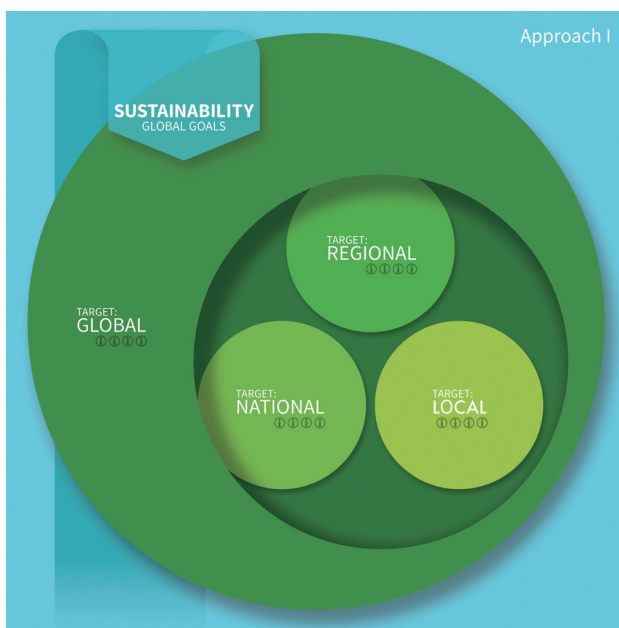
First, frame the goals in ways that recognize the systemic challenges associated with the causes and effects of human-domination of the Earth System. The systemic challenges have both human and planetary dimensions, and they interact with one another. Prominent features generating new needs for managing these dimensions are: the inter-linkages between different regions and sectors, the increased salience of planetary well-being, a greater incidence and risks associated with non-linear changes, and the growing

importance of unprecedented phenomena on a global scale. The concern with Earth's life support systems cannot *replace* the drive to eradicate poverty, improve health, and in other ways enhance the quality of life for the disadvantaged that inspired the Millennium Declaration. However, protection of the Earth's life support systems will be an essential component of any effective strategy for providing future generations with opportunities equivalent to those that some societies and groups within the current generation enjoy. This will have profound distributional implications.

Second, take advantage of diversity. The motivational impact of the SDGs will depend on their appeal to governments and private stakeholders operating under different circumstances. Critics have pointed to the "one-size-fits-all" format of the MDGs as an important shortcoming. One of the lessons to be learned from experience with the MDGs is that it is important to take "... into account different national realities, capacities and levels of development and respect ... national policies and priorities" to maximize motivational impact (UN 2012, Paragraph 247). This will be all the more important with regard to the SDGs, which must guide the actions of advanced industrial societies as well as developing societies. One way to build constructively on diversity may be to establish multi-layered targets – to be formulated at the global level, but where possible and relevant, also tailored at various sub-global levels of governance. These targets could guide and serve as a basis for presenting a menu of (broad) policy options from which stakeholders with different needs and

capabilities can choose. Targets at the sub-global level should be designed to help achieve the overall global goals and targets by taking advantage of capabilities available to governments and stakeholders at different levels (international, national, local). National level targets should not only build upon global goals but also upon existing national commitments and priorities, which would then help identify new policy options that countries are already familiar with. This could be a starting point for their implementation (Pintér et al. 2014). Targets are the appropriate level at which to consider diversity because in this way stakeholders can acknowledge clearly targets guiding their own actions. The risk in such an approach is that less ambitious targets may be adopted while more demanding targets are not dealt with. This risk indicates that there is a need for governments to guide and monitor which targets are being set and implemented and, at times, to step in and implement others. Beyond governmental guidance and oversight, this also underlines the need for a strongly mandated international review and accountability mechanism.

Third, frame individual goals and targets in such a way that they can serve as focal points for stakeholders who support them. In tackling systemic concerns (e.g. poverty, climate change, biodiversity), it is important not to overlook potential support coming from actors who have priorities and motivations other than sustainability. An effective campaign to reduce greenhouse gas emissions, for example, may benefit from the concerns of citizens regarding health impacts of air pollution



There are different ways to design the menu of targets. In Approach I, regional, national and local authorities can design their own targets which connect within the global target defined in the Sustainable Development Goals process. In Approach II, these sub-global targets are nested within each other in a system where political decisions at one level shape progress at other levels. While there may be advantages and disadvantages to both approaches, they can both be deployed in the SDG system with Approach II being used in regions with strong regional authorities and Approach I being used in areas where local constituencies can mobilize around creating targets at a specific level.

caused by coal burning. From this perspective, targets can be designed to facilitate behavioral change in diverse stakeholder groups. Sustainable development is a multidimensional concept, and this complexity provides ample opportunities for governments and stakeholders to focus on issues that are compatible with their particular interests. Co-production of SDGs, especially at the target level, will be essential in this regard. One challenge here involves the design of target-setting processes that can keep ambitions high, while taking individual conditions and capacities into account. Such processes by themselves, if well designed, could trigger positive behavioral change.

Fourth, focus on a small number of distinct goals that are "critical nodes" to address multiple issues. Framing the SDGs may foster settings in which negotiators are anxious to produce positive results. They may agree to last-minute compromises encompassing long lists of more or less compatible provisions that do not provide clear direction toward fulfilling the overarching goal. There are compelling reasons to heed the injunction of the Rio+20 outcome document to keep the SDGs "limited in number." The formulation of the SDGs offers rich opportunities to bridge gaps among sectoral silos by framing goals that are cross-cutting and integrative in nature. The "nexus" of food, water and energy seems

to command sufficient consensus to provide a learning opportunity about the benefits of identifying the connections between discrete policy domains.

Fifth, devise effective procedures to track progress. Studies of international regimes in domains such as human rights and environmental protection have pointed to institutionalized processes of performance review as key components needed to achieving significant progress. This finding is quite relevant to successful goal-setting efforts; it will be particularly important where the complexity of the goals poses challenges for those seeking to assess progress. The multidimensional concept of sustainable development is not easy to translate into a small set of operational indicators. Yet a well-designed performance review system including a "Global Sustainable Development Report," and analogous reporting mechanisms at the national level and providing roles for actors beyond national states, can help by providing a blend of advice and encouragement on the one hand and naming and shaming on the other. Indicators are also important in target setting by defining baselines and starting points for transition pathways. In addition, one new dimension required for the review of SDGs is the need to include monitoring the key dimensions of Earth system transformation.

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