

**Remarks to the Science Technology and Innovation Forum of the Technology Facilitation Mechanism
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The cluster of SDGs that are the focus of this year's SDG review – hunger, poverty, health, institutional health and governance – were already challenging, and all have been exacerbated by the Covid pandemic in ways that will have echoes for many years.

It is increasingly clear that our current research approaches to addressing the underlying challenges to the global commons will not be effective or timely. It is time for substantive reflection on how science is developed and applied. We must not return to business-as-usual, and the knowledge disciplines – the natural, social and data sciences and the normative humanities – are central to moving forward.

Science has been the hero of vaccine development. Yet, the variable uptake of public health evidence into the political and public response to the pandemic reflects variable perceptions of the use of science. Political processes have interfered with the best use of available knowledge, and the multilateral system has been surprisingly ineffective. And we are years from resolving the social, financial, political and multilateral issues the pandemic has revealed, even if we do find our way through the virus-versus-vaccine arms race.

Urgency and potentially disruptive change are needed if we are to meet the enormous number of challenges ahead. We have a science system largely composed of disparate agendas and

incentives, and no real mechanisms to identify the key priorities and actions by which science can address these issues.

Is it time for a more collective and co-designed approach between funders, academia, experts and the multilateral system to identify the science priorities needed to advance on the challenges of the global commons? We do not have the luxury of waiting and hoping that science developed in the traditional manner will reach timely solutions.

Funders and those who set their mandates, whether governments or foundations, create the incentives that scientists respond to. These are not well suited for what we now face. Funders largely support disciplinary research that is often relatively predictable in result, rather than intellectual innovation and risk, and most are not really focusing on finding translatable solutions to the problems that will define our common futures. The pandemic, climate change and many other existential issues surely demonstrate that national self-interest is best served by a more global and connected approach. Of course, there is much science needed of a detailed nature and specific to the country or society and context, and that is essential to fund. But there is an obvious gap that needs new thinking, new approaches, new funding and new mechanisms.

The very research most needed is neither systematically identified nor supported. Outside the G20 group of countries, funds for research are limited by the very nature and size of the economies, yet much knowledge and many key and diverse perspectives lie beyond. And collaborative international research has been the first to suffer in austerity.

We need those who have the capacity to change what science is needed for, how science operates and what it delivers to work together to co-design new ways of working on the sustainability agenda. Put simply, the current model is not working for the global good and therefore cannot ultimately be for the national good. Governments, science funders and the scientific community must agree on a new approach.

We need to think about why we have tended to fail to address many wicked problems. There are obvious failures of multilateralism, but even within science there have been issues. These include a lack of strategic analysis to determine priorities, resource limitations, or a promotion of competition over collaboration. Academic institutions contribute enormously to these issues.

The fundamental needs for impactful progress include greater investment in a range of social sciences. It is not just all about technology, but employing a genuine approach to transdisciplinary research and promoting systems-based approaches.

Of course, there remains enormous needs in specific areas for specific scientific breakthroughs and technology employment. But take food production – we likely have much of the biological knowledge and many of the technologies to reduce the impact on biodiversity and greenhouse gas emissions and at same time improve human health. Yet the social issues are enormous: how to get social license, how to link with indigenous knowledge, how to get beyond short-term market restraints, how to change food supply systems and use the knowledge we already have. And whatever is done is not independent from every other aspect of human existence; the issues of food security vary dramatically between the global north and global south. Hence there is a need for systems- and futures-focused approaches.

There is a deeper need for quality social science to be applied: how to reform the multilateral system, how to get politicians to understand that it is in their enlightened self-interest to cooperate on issues of the global commons, how to encourage policymakers and the public to stop underestimating risk, and how to deal with rampant disinformation which can impede progress on the challenges of the commons.

We need transdisciplinary research, which is a very different modality of thinking and research. It means *ab initio* framing the question through multiple lenses simultaneously. It means engaging stakeholders from the outset. The research actually emerges out of that interaction between framers and stakeholders. Such research is not linear in the nature of most traditional research,

but it is likely the only way we will make real progress with policy makers and citizens on many of the issues we now face.

Time is of the essence. We need the world's best thinkers – irrespective of country, and not only scientists – to be put in a position where they can jointly identify the issues where a collective scientific approach is urgently needed, define what are the rate limiting knowledge gaps and technologies, and support transdisciplinary approaches.

The ISC and IIASA have developed a provocation of how disruptive progress might be achieved. It requires a partnership between ISC representing the knowledge disciplines globally, and the broad mix of major science funders and key players in the multilateral system. The goal would be to agree on a process to urgently define the core rate limiting gaps in our knowledge and its application and to collectively support that in a mission-led approach.

We need to learn from big science-based efforts like the moon landing. This required political leadership, strategic planning, parallel investment and deep expertise. What we need now is multilateral political leadership in partnership with funders and the science community to identify the real roadblocks to sustainability, and progress those. We need to focus on those high-level rate limiting steps blocking progress. This must be in addition to, not at the expense of science for local context and good. This needs a real commitment and likely needs a global think-tank and committed team. The stressors are obvious – demographic shifts, rapid technology emergence, climate change and environmental collapse. The central domains of focus – cities, food, water, health and energy – may be obvious, but the really critical questions are deeper and often require not technological but rather a holistic and systems approach focusing on the delivery of solutions-oriented, transdisciplinary, transformative outcomes. This will require mission-driven research, which will involve all types of research in all relevant disciplines particularly those involving transdisciplinarity; ironically, this is the research modality current systems largely do not fund. It requires strong engagement with policy, practice and the citizens. It requires equitable collaboration (North-South and South-South) as well as ensuring access to all necessary capacities and tools (e.g., libraries, big data tools, models for systems integration). Effective knowledge

brokerage systems are needed in every society, yet science advice remains a poorly developed capacity in most.

Relying on the traditional model of funding and planning science will fail. The ISC is in a unique position to work with partners to co-design a process to make the breakthroughs needed.