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# Funding impact: The landscape for transdisciplinary sustainability science support

**Significance:**

A key challenge facing those interested in developing sustainability science engagement and engaged sustainability science approaches is identifying relevant sources of funding for transdisciplinary forms of science that involve multi-actors in the scientific knowledge generation process. This Commentary provides an overview of progress made in the international research funding sector towards support for such research through large-scale granting mechanisms, and points to some challenges that remain.

The concept of transdisciplinarity, which emerged in the 1970s and 1980s, was originally made popular in the fields of science studies, philosophy and systems thinking by, amongst others, French philosopher Jean Piaget and theoretical physicist Basarab Nicolescu. Since then, transdisciplinarity has steadily gained traction in fields such as global environmental change and public health, and is today advocated most prominently in the broader domain of sustainability science.<sup>1</sup> It is in this broad domain that transdisciplinarity was explicitly picked up by research funders, at national and international levels, and made central to many of their funding schemes.

## Belmont Forum

Interestingly, the promotion of transdisciplinarity as a funding criterion accompanied a move towards multilateral funding for global change and sustainability research. The historical roots of this date back to 1990 with the establishment of the International Group of Funding Agencies for Global Change Research (IGFA).<sup>2</sup> The IGFA was an informal group consisting of representatives from 21 national research agencies, including South Africa’s National Research Foundation (NRF), and the European Union. The IGFA met annually to share best practices and emergent trends, and to encourage commitments in promoting interdisciplinary global change research, including support for the work of the four major international global change research programmes in existence at the time. The latter included the World Climate Research Programme (WCRP), established in 1980; the International Geosphere Biosphere Programme (IGBP), established in 1986; the Diversitas programme on biodiversity science, established in 1991; and the International Human Dimensions of Global Environmental Change Programme (IHDP), established in 1996.

IGFA had no decision-making authority and collective or joint funding was not possible at that stage. Each agency independently pursued their own global change initiatives, but in a manner informed by the work of fellow agencies. Multilateral collaboration between those agencies was realised only to the extent that each provided support to the international programmes mentioned above.

Two important processes – both essentially aimed at amplifying and accelerating the impact of global change and sustainability research, and both adopting transdisciplinarity as a pathway to impact – were initiated in 2009: the establishment of the Belmont Forum and of Future Earth. The Belmont Forum process was led by the National Science Foundation (US) and the Natural Environmental Research Council (UK), which hosted a meeting of selected environmental and geoscience funding agencies at the Belmont Conference Centre in Maryland, USA. The group agreed to collaborate as a forum committed to jointly funding and supporting “international transdisciplinary research providing knowledge for understanding, mitigating, and adapting to global environmental change”. This intention was realised when the Belmont Forum’s first Collaborative Research Action (CRA) on Coastal Vulnerability and Freshwater Security was launched in 2013. The Forum’s latest call, developed under the leadership of South Africa’s National Research Foundation, focuses on supporting African research collaboration in three priority themes: the water-energy-food-health nexus; pollution; and disaster preparedness, responsiveness and recovery (<https://belmontforum.org/cras#arc>).

The Belmont Forum served as the Council of Principals for IGFA until 2014 when the two bodies formally merged under the banner of the Belmont Forum<sup>3</sup> and with a jointly appointed permanent secretariat put in place by 2015. Since its inception, the Belmont Forum has launched 21 calls for proposals from an international research audience and funded 155 projects. More than 1000 scientists and stakeholders from over 90 countries have participated and benefitted from the Belmont Forum collaborative actions. The themes addressed to date include food security, climate predictability and inter-regional linkages, biodiversity and ecosystem services, Arctic observation and science for sustainability, and mountains as sentinels of change. On average, the Belmont Forum has committed USD12.5 million per annum over the period 2013–2022 to transdisciplinary and collaborative global change research (Arbour N, 2024, written communication, May 02). One of the Belmont Forum CRAs focused on the theme of transformations to sustainability.<sup>4</sup> This represented a second phase of an international funding programme that the International Social Science Council launched, with support from Sida<sup>5</sup>, the Swedish development cooperation agency, in 2014. Phase one of the T2S programme funded 38 seed grants and three major international projects called Transformative Knowledge Networks (TKNs). In the second phase, the Council, again with the support of Sida, combined forces with the Belmont Forum and a network of European agencies focused on support for the social and human sciences (NORFACE<sup>6</sup>) to jointly fund 12 TKNs.

The T2S programme demonstrated the multiplier effect of the partnerships that the Belmont Forum was able to convene. It also provided the Forum with an approach to increasing participation of scientists from Global South countries that do not hold Belmont Forum membership; this participation was enabled by Sida funding.

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Regarding participation of scientists from Africa in Belmont Forum collaborative actions, there are currently only three funders representing the continent in the Forum's membership. They include South Africa's NRF; the Fonds pour la science, la technologie et l'innovation (FONSTI), Côte D'Ivoire; and the National Research Foundation of Kenya. Despite this, earmarked resources provided by some Belmont Forum members (e.g. the Research Council of Norway) and partners like Sida, as well as the US-based organisation known as START (Global Change SysTern for Analysis, Research & Training<sup>7</sup>), have ensured African participation in at least 10 Belmont Forum CRAs. Since 2013, funding available for African researchers from the Forum has amounted to approximately USD6.3 million, of which USD1.6 million came from African funding agencies and USD4.7 million from Belmont Forum partners. Across all CRAs to date, 57 African institutions from 22 African countries have been involved in Belmont-funded research. African participation in Belmont Forum initiatives is still restricted. However, recent developments in the Science Granting Councils Initiative<sup>8</sup>, aimed at growing active national science granting agencies across Africa, will hopefully broaden this participation in international co-funded Belmont Forum-like initiatives from the continent. Impact reviews of Belmont Forum funding to date are available online.<sup>9</sup>

## Future Earth

The second important process initiated in 2009 involved the merger of the IGBP, IHDP and Diversitas global environmental change programmes into what became Future Earth<sup>10</sup>, an international sustainability science research network formally launched during the Rio+20 Summit in 2012. Future Earth supports 27 Global Research Networks, all intended to generate inter- and transdisciplinary research at the forefront of sustainability science. With support from national funding agencies and via external fundraising, Future Earth provides limited grants (typically about EUR50 000) to support international travel, as well as diversity objectives including early career development activities. The impact of Future Earth is summarised in its comprehensive series of annual reports.<sup>11</sup>

Alongside international bodies like the International Science Council (ISC) (and its predecessor organisations, the International Council for Science and International Social Science Council), Future Earth became a partner of the Belmont Forum. In this way, the Forum convened a powerful international group of sustainability science funders, researchers and advocates, all working together to advance transdisciplinary research.

A Future Earth Africa Hub, hosted by the NRF, and including a Leadership Centre that is co-led by the Universities of Rhodes and Pretoria, was launched in 2023. The Leadership Centre will serve to support transdisciplinary sustainability science on the African continent through the development of science clusters, the nurturing of young emerging scientists and, ultimately, the establishment of an African Sustainability Science Association.

## International Science Council

The ISC was established in 2018 following a merger of the International Council for Science and the International Social Science Council. Both these predecessor organisations had a long history of supporting international global environmental change research, a function that has been taken forward by the ISC with a focus on transdisciplinary sustainability science.

In 2019, the ISC led the convening of a first meeting of what was called a Global Forum of Funders (GFF).<sup>12</sup> This marked a further significant move towards support for international transdisciplinary sustainability science research. The 2019 event was hosted by the National Academies in Washington DC, and brought together leading representatives of national funding agencies (including Belmont Forum and Global Research Council members), development cooperation agencies, as well as philanthropic foundations. The purpose was to explore pathways to fast-tracking the global response to Agenda 2030 by means of increased levels of ambition in cross-sectoral and multilateral funding. The GFF, which met again in 2021, requested the ISC to propose a mechanism to achieve more rapid global SDG progress. In 2021, the ISC published a landmark report, *Unleashing Science: Delivering Missions for Sustainability*.<sup>1</sup> The

report highlighted a number of salient points for more rapidly achieving a sustainable future, including:

- (i) the urgency for meaningful interventions to fast-track the delivery of the SDGs at scale and with impact;
- (ii) that the funding base for transformative sustainability science must be scaled up to a point where the science can meaningfully engage with society and that is proportionate to its attempts to address some of the most pressing problems faced by humanity, including climate change, inequality, food-, water- and energy security;
- (iii) that the prevailing science-guided sustainability change agenda is faltering for a variety of reasons, including lack of credibility, trust, and political and societal buy-in as well as nefarious profit-seeking agendas;
- (iv) that science needs to change the way in which it engages society, ensuring that it works with rather than for society (this is required to build trust and find traction for meaningful societal transformation in pursuit of sustainability);
- (v) the most appropriate research approach for achieving these objectives is an honest transdisciplinary research agenda that is deeply committed to the principles of co-design, co-production and co-implementation<sup>1</sup>.

In response to the *Unleashing Science* report, the ISC convened the Global Commission on Science Missions for Sustainability in December 2021, and tasked a Technical Advisory Group to provide an implementation pathway for Science Missions. The Technical Advisory Group's recommendations, *A Model for Implementing Mission Science for Sustainability*<sup>13</sup>, were summarised in a consensus Commission report, *Flipping the Science Model*<sup>14</sup>, in 2023.

The ISC Science Missions initiative is ambitious; it is targeting the establishment of up to 20 Science Missions around the globe, with an emphasis on regions which are lagging most in achieving the SDGs. The ISC is targeting an annual budget of ~USD1 billion for the entire network of 20 Missions, over an initial 10-year period. This would place the ISC Science Missions initiative at a similar scale of funding to the global CGIAR network<sup>15</sup> with its particular focus on promoting food security and the green revolution.

To achieve the targeted USD1 billion/annum investment in transdisciplinary sustainability science will require collective commitments from national and private research funders and foundations and private sector partners. Despite this ambitious funding target, a sum of USD1 billion/annum would represent less than 1.5% of the annual budgets available to the Global Forum of Funders alone, and less than 0.5% of the global annual R&D spend. This seems to be a minimal investment in an attempt to rescue Agenda 2030 and secure a sustainable and dignified future for humanity. The remaining 98% of research funding is either distributed nationally or allocated to shared large science infrastructure projects. However, should these efforts by the ISC succeed, it would represent an unprecedented commitment to support broad-ranging multilateral scientific cooperation in pursuit of Agenda 2030. The further development of multilateral sustainability science funding mechanisms, complementary to ongoing national funding commitments, is essential for achieving the SDGs, as no single nation state or region will achieve a sustainable future on its own.

To start this ambitious initiative, the ISC recently called for pilot proposals to establish demonstration Science Missions for Sustainability<sup>16</sup> and to generate appropriate funding support. The launch of the selected pilots is anticipated for 2025.

With key developments in the international funding landscape, such as the ones described above, support for transdisciplinarity as a pathway to sustainability research impact has come into its own. However, what has also become clear during the development of transdisciplinary research over the last decades, is that the successful execution of transdisciplinary research projects requires a critical mass of core competencies that are not easily entrenched in traditional disciplinary academic structures. A mix of stakeholder engagement, participatory methods, data intensive



scenario development, collaborative project management, monitoring and implementation, and multidisciplinary researcher participation skills, is what the ISC Science Missions for Sustainability call is attempting to create.

## Declarations

We have no competing interests to declare. We have no AI or LLM use to declare. Authorship was determined alphabetically. Both authors read and approved the final version.

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