Operationalizing Sustainable Development to Benefit People and the Planet

The COVID-19 pandemic and overlapping global crises, including geopolitical conflict and climate change, have made achievement of the United Nations Sustainable Development Goals (SDGs) more challenging. The scientific community increasingly recognizes the need to accelerate the adoption of evidence-based, scientifically-sound policies and actions to operationalize sustainable development. Achieving the SDGs will require broad engagement and commitment from governments, the private sector, funders, and civil society;[1] however, stakeholders lack a shared understanding of how the 17 SDGs can be operationalized.[2] Moreover, despite the high degree of interest in the types of activities included in the SDGs, recognition of the SDGs is low in the United States.[3]

This short consensus study report identifies key research priorities and possible actionable steps to operationalize sustainable development. The report builds on discussions among scientists, policymakers, business leaders, and youth leaders during the *Nobel Prize Summit: Our Planet, Our Future* in April 2021. The committee then convened two virtual public workshops in April and May 2022[4] to gather information on positive case studies across eight interrelated themes (summarized below), which served as the primary source of evidence for its work. Although the scope of the challenges and opportunities are global with many research investigations and actions needed, the committee developed the following research priorities and possible actionable steps for consideration by U.S. stakeholders, informed mostly by the workshops. The committee

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[1] See https://council.science/wp-content/uploads/2020/06/202109_A-Synthesis-of-Research-Gaps_Final.pdf.
[2] See https://www.nature.com/articles/s41893-019-0352-9.
[3] See https://s3.amazonaws.com/media.unfoundation.org/2021/12/MorningConsult_UN-SDG-Presentation-Deck-D3-MPR_JJM_CB-.pdf.
[4] The final agendas and recordings from all sessions are available at https://www.nationalacademies.org/our-work/operationalizing-sustainable-development.
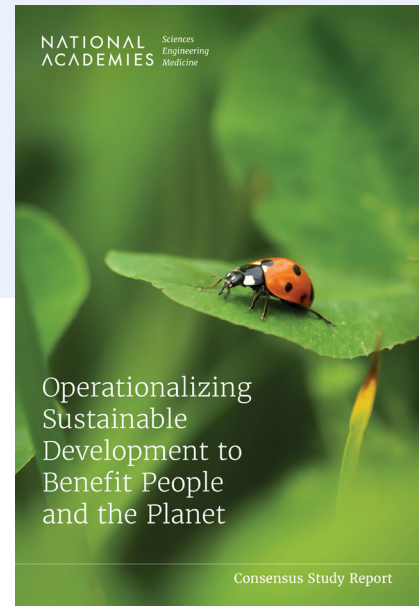
believes that these recommendations are ambitious but realistic and, taken together, can make a measurable difference in a sustainable future for all.

EDUCATION AND CAPACITY BUILDING

Education is critical to achieving the SDGs, and educational institutions at all levels are powerfully positioned to operationalize sustainable development across society. Within the United States—whether within the federal government, media, educational systems, or other domains—public knowledge about the SDGs is limited. Building sustainable mindsets begins at a young age, but there is little effort at the K–12 and university levels to apply inquiry-based learning to help students learn about the SDGs.

Key Research Priorities: It would be useful to examine how sustainability education programs at the undergraduate and graduate levels can prepare all students, regardless of major, to contribute to advancing a post-2030 agenda for sustainable development, as well as identify best practices in field building for sustainable development at the undergraduate and graduate levels that will be important for research and education in moving that agenda forward.

Possible Actionable Steps: Universities could undertake initiatives to assist faculty and students to develop Voluntary University Reviews (VURs)[5] to ensure that students regardless of major are exposed to the challenges and opportunities in sustainable development, and to partner with local and national government and nonprofit organizations to advance the SDGs. Governments and education leaders could engage the public to raise awareness of the SDGs, and cities and school districts could initiate and support locally relevant K–12 learning on the SDGs.

LOCALIZATION OF THE SDGs AND INDIGENOUS KNOWLEDGE

The SDGs embrace global aspirations, but they must be rooted in local buy-in and implementation. The committee's workshop session on localization underscored the value of Voluntary Local Reviews

(VLRs). When these reviews occur, the dialogue between and across levels of government has been positively influenced to accelerate progress toward the SDGs. Examples of implementation of VLRs in U.S. cities include New York City, Hawaii, Los Angeles, Orlando, and Pittsburgh. As shown in Pittsburgh, development of a VLR can also connect local academic institutions to the surrounding community.

Key Research Priorities: It would be useful to understand the synergies and tradeoffs that can help to achieve localization of the SDGs; identify key mechanisms that address poverty and empower vulnerable communities; and explore ways to make science systems more inclusive and equitable, to involve a wider range of voices, institutions, types of knowledge, and approaches to learning that are designed to capture local needs.

Possible Actionable Steps: The U.S. government could commit to creating a Voluntary National Review (VNR) by encouraging more states and cities to conduct VLRs and synthesize this already good work at the local level to scale to a VNR roll-up. Local officials could commit their support to the SDGs and use the framework to align local policies and initiatives. Urban leaders and practitioners as well as philanthropic organizations could learn from case studies and knowledge networks, including how others effectively incorporate indigenous knowledge to advance sustainability.

FOOD SYSTEMS

The food system encompasses a wide range of activities from input supply and the production of crops, livestock, fish, and other agricultural commodities to storage, transportation, processing, packaging, consumption, and waste disposal. The current food system is responsible for one-third of global greenhouse gas emissions and 70 percent of global water use.[6] Although it produces an abundance of food (as well as food waste and ecological damage), approximately 2.4 billion people (or 30 percent of the global population) lacked access to adequate food in 2020,[7] even before the current rise in global food prices and the disruption of the supply chain

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[5] Examples include https://local2030.org/library/848/Carnegie-Mellon-University-Voluntary-University-Review-2021.pdf.

[6] See https://www.worldbank.org/en/topic/water-in-agriculture#1.

[7] See https://www.fao.org/publications/sofi/2021/en.

exacerbated the situation. Addressing these issues and operationalizing the SDGs will entail holistic reform of each link in the food system.

Key Research Priorities: Studies could conduct a comprehensive analysis of the entire food system; examine how to transform food systems to achieve critical progress on the SDGs; and examine the future of alternative proteins, precision fermentation, 3D printing of meat, fish, and plant-based proteins to support sustainable, nutritious, and equitable food systems including consumer acceptance.

Possible Actionable Steps: Urban leaders could accelerate initiatives toward sustainable and equitable food systems with an appropriate sense of urgency, given that the urban population is projected to increase rapidly in the coming decades. Universities and the private sector could support training and workforce development at universities, community colleges, and tribal colleges to promote sustainable and equitable food systems.

URBANIZATION

The role of urban areas in sustainable development has been increasingly recognized over the past several decades. Local-scale sustainability transformations are important, and there are many opportunities for synergies among SDG goals related to urbanization. For example, restoring wetlands and urban forests can bolster food security, provide flood and drought relief, buffer urban heat island effects, and reduce air pollution, as well as provide city dwellers mental and physical relief from stress. Transitioning to low-carbon (e.g., bike-friendly or bus-based) transport systems can not only reduce carbon emissions but also decrease obesity levels, improve local economies, and reduce air pollution.

Key Research Priorities: It would be helpful to improve data collection and reporting at the local level, including of disaggregated and city-level data; create open data hubs and portals to capture information from local agencies and community-generated data sets; and improve the understanding of the types of data needed from cities to monitor SDG transitions along environmental, social, and economic considerations.

Possible Actionable Steps: Research institutions could create opportunities for workshop reports and journal special editions that focus sharply on identifying critical knowledge gaps relating to big data and research on cities and on producing new knowledge of special relevance to direct action, such as providing guidance to funders about areas for future work.

DECARBONIZATION

Decarbonization of energy systems is central to global decarbonization and achievement of all SDGs. A fundamental energy-systems transformation would help to address health, climate, and other challenges facing humanity, and would especially benefit individuals without access to affordable and clean energy services. Carbon dioxide removal (CDR) technologies are in the early stages of development, their unintended consequences are not known, and they require massive scale-up and financial investment.

Key Research Priorities: Studies could examine fundamental science for ocean- and nature-based CDR; conduct standards setting for monitoring, reporting, and verification techniques for various pathways; explore acceptable levels of uncertainty in certification; and examine technologies that enable large-scale deployment of carbon capture, utilization, and storage, with an emphasis on durability and ways to scale-up.

Possible Actionable Steps: The U.S. government could identify strategies for CDR that are place-based, community embraced, and environmentally and intergenerationally just; ramp up research, development, demonstration, and deployment for all forms of CDR; and enhance federal coordination among agencies relating to monitoring, reporting, and verification. Governments, the private sector, and nongovernmental organizations could work together to promote decarbonization, including building carbon-neutral cities, strengthening climate education and engagement, and encouraging low-carbon lifestyles for mobility, housing, and consumption.

SCIENCE, TECHNOLOGY, AND INNOVATION FOR THE SDGs

Seven years after agreeing on the SDGs, the world is not on track to achieve them, and applying science,

technology, and innovation (STI) across the SDGs may represent a way to recalibrate and move ahead. Partnerships across sectors and disciplines, including STI, offer hope for resurgent multilateralism and innovative approaches to advance the SDGs. Digital and other technological advances offer new possibilities across sectors and communities. STI is a way to engage youth in development issues and could provide an opportunity to enhance training and capabilities of a technology-savvy workforce in both formal and informal settings.

Key Research Priorities: Studies could examine the current status of achieving the SDGs in the United States and what resources and actions are needed to advance the SDGs in the context of the economic crisis, the COVID-19 pandemic, and geopolitical conflicts, building on *The Sustainable Development Goals Report 2022* by the United Nations Development Programme[8] and the Brookings and UN Foundation's report on *The State of the Sustainable Development Goals in the United States*.[9]

Possible Actionable Steps: Governments, international organizations, nongovernmental organizations (NGOs), the private sector, and scientific communities could discuss a new vision for a sustainable and resilient future beyond the 2030 Agenda for Sustainable Development. The private sector could lead the advancement of STI in sustainable design and operation toward scalable achievement of the SDGs. Philanthropic organizations could highlight and support examples of effective solutions to SDG challenges and sustainability challenges at the local, national, and global levels.

SCIENCE AND PEACE

SDG 16 covers a lot of ground including the reduction of all forms of violence, equal access to justice for all, increased accountability and transparency, and the protection of fundamental freedoms. Conflict undermines achievement of all SDGs. Although all of the SDGs are necessarily cross-cutting, SDG 16 has a particularly diverse constituency that encompasses child rights organizations, peace-building organizations, police,

military, democracy groups, judiciary, and many others. The lack of data emerged from almost every workshop session but seemed particularly salient during this session.

Key Research Priorities: There is a need to strengthen SDG data hubs, partnerships, and data for SDG monitoring and enforcement relating to science and peace and other relevant issues; explore survey instruments on SDG 16 and the interlinkages between different variables; and support countries to collect data on access to justice, corruption, discrimination, and trafficking.

Possible Actionable Steps: Governments, academia, NGOs, and international organizations could create peer groups for implementing and monitoring the SDGs, dealing with crisis situations, and facilitating exchange among justice actors, peace builders, and inequality experts. The scientific community could promote positive examples for supporting Ukrainian scientists, and additional efforts and funds are needed to support science, engineering, and medical professionals in other nations including Afghanistan, Myanmar, South Sudan, Syria, Venezuela, Mexico, and Nicaragua.

FINANCING TO ACHIEVE THE SDGs

Financing can support the realization of many of the opportunities identified throughout this report. Yet, unlocking this capital is complex. Despite the challenges, opportunities exist to realize tangible and intangible benefits from SDG-related investing. Invest NYC SDG has attracted the private sector to sustainable investments in one of the most investor-focused cities on the planet. The demand for positive ESG (environmental, social, and governance) investments creates demand for more blended finance options that are favorable to public, private, and other projects with significant and measurable social benefits.

Key Research Priorities: It would be useful to explore place-based initiatives in need of private investment, such as community-supported initiatives, or other means of providing capital for P3; examine key ways to unlock financing for the SDGs; develop strategies to advance

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[8] See https://unstats.un.org/sdgs/report/2022/The-Sustainable-Development-Goals-Report-2022.pdf.
[9] See https://www.brookings.edu/wp-content/uploads/2022/03/2022_Brookings_State-of-SDGs-in-the-US.pdf.

adoption of emerging integrated reporting standards; and explore costs, benefits, challenges, and opportunities relating to certification standards.

Possible Actionable Steps: Public, private, and other organizations could create more blended finance options given the growing demand for positive ESG investments where social benefits are significant and measurable. Funding agencies and philanthropic organizations could promote additional investment into the development of local value chains and sustainability innovations, using a circular economy framework.

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