Preface

As the interconnection of the physical and social aspects of sustainability are increasingly well recognized by nations and cultures around the world, discussions and decisions about what is best for humankind in the face of extreme change and upheaval have moved from a primary, almost singular focus on mitigation, to one that elevates adaptation and capacity building for resilience. Sustainability activities, tied to building resilience, have largely coalesced around the Sustainable Development Goals, known as the SDGs. The SDGs are 17 globally agreed-upon goals with 169 targets that encapsulate the major social issues in the world today. These goals range from poverty and hunger, health, education, gender and inequality, to water and oceans, cities, infrastructure, energy, climate change, natural resources, peace, jobs and partnerships. The impetus for this book is the urgent need for the education community, at all levels, to purposefully address the SDGs in actionable ways that contribute directly to helping individuals, communities, nations, and the world build resilience to extreme and often violent change.

Educators not only convey knowledge and information; they also conduct research and help define what counts as knowledge. This opportunity to create the kind of global awareness across generations that catalyzes meaningful action in response to the most critical issues impacting the environment and society also carries somber responsibilities. In 2017 at the United Nations High Level Political Forum on Sustainability, UN General Assembly President and Higher Education Sustainability Initiative (HESI) keynote speaker Peter Thompson identified education as a key driver of sustainable development asserting that "no enabler more powerful than inclusive, equitable education for all" (United Nations Department of Social and Economic Affairs, 2017).

Education is specifically addressed in SDG #4, but it has a much more far reaching role as a building block for peace, resilience, and sustainable development. Educators are charged with scaling up and changing educational delivery on the ground and virtually in ways that change the conversation about sustainability and resilience. Knowledge empowers people to take ownership of the SDGs and to take positive steps towards resilience. Alongside Mr. Thompson, UN Deputy

Secretary-General Amina Mohammed labeled education as "the cornerstone of sustainable development…We know when we deliver education to a young person, we're not only delivering the knowledge and skills they will need to chart their own future — we're preparing them to lend their hands, their mind, and their heart to shaping a more peaceful, prosperous future for their society, and indeed, for the world" (UN Department of Social and Economic Affairs, 2017). Towards that end, Mr. Thompson explicitly asked for universities to incorporate the SDGs into their curricula and learning processes.

In May 2018, the University Network for Climate Capacity (UNCC) was launched by a group of educational and research institutions that came together though their work with the Research Constituency of the United Nations Framework Convention on Climate Change (UNFCCC). The UNCC is charged with sharing curricula, developing research partnerships across the Global South and Global North, and helping to provide research to countries working to deliver their promised contributions to the Paris Agreement and the Sustainable Development Goals. Implicit in its mission is building global youth capacity to lead SDG implementation and long-term stewardship of the legacy of the SDGs. Developing the next generation of leaders for building resilience under extreme social and physical change represents one of the most poignant areas in which the youth experience with science and environmental issues is not only desirable, but crucial for infusing thoughtful actions into increasingly difficult and complex sustainability decision processes. The escalating importance accorded to education in enabling achievement of the SDGs guides the consideration of education's responsibility to sustainability as addressed by the authors in this book.

A BRIEF HISTORY OF EDUCATION AND THE SDGS

Multilateral process documents leading up to the SDGs unambiguously endorse the value of youth education in addressing the crises of global sustainability and resilience development. In 2002, the United Nations General Assembly proclaimed the United Nations Decade of Education for Sustainable Development (2005–2014), emphasizing the indispensable role of education in achieving sustainable development. The Rio Declaration on Environment and Development of 1992 (RIO) calls youth an indispensable component in achieving sustainable development, a statement that was echoed in official transcripts from RIO+10 in 2002, RIO+20 in 2012, and in Agenda 21, in Chapter 25 *Children, Youth and Sustainable Development* and in Chapter 36 *Promoting Education, Public Awareness and Training* (Agenda 21, 1993). The UNFCCC position on the value of education in sustainability (Article 6) and the Kyoto Protocol (Article 10) promoting awareness and education were

both reaffirmed through the 2014 Lima Ministerial Declaration on Education and Awareness-Raising at COP20 held in Lima, Peru, in December 2014 and as part of the 2015 Paris Agreement. Authorized at the Rio Earth Summit on sustainability in 1992, and as the parent treaty to the Kyoto Protocol from which the SDGs evolved, the UNFCCC is the convention through which the Sustainable Development Goals (SDGs) became linked with the 2015 Paris Agreement (UNFCCC, 2015). The UNFCCC also oversees the framing, implementation, monitoring, and evaluation of the SDGs, and countries' progress towards achieving the goals.

Contained in Agenda 2030 (UN General Assembly, 2015), the SDGS were conceived at the Rio+20 Conference in 2012 which concluded with the agreement by Member States to launch a process to develop a set of Sustainable Development Goals (SDGs) as a successor framework to the Millennium Development Goals (MDGs). The SDGs came into effect in September 2015, just prior to the authorization and first signatory countries pledges in support of the Paris Agreement in November at the meeting of the UNFCCC. Several landmark changes to multilateral paradigms were inaugurated through Agenda 2030 including the integration of the three fundamental pillars of development: economic, social, and environmental. As an accepted, universally applicable approach, countries from both the Global North and Global South agreed to implement it. And, it includes issues that had previously been outside the scope of development, especially peace and climate change (Independent Commission on Multilateralism, & International Peace Institute, 2016).

SDG Goal #4 is Quality Education, which is designed to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (UN General Assembly, 2015). Each SDG has an associated set of established targets and global indicators associated with those targets. (See the Appendix for a list of education goal targets and indicators.) But addressing targets does not always equate with sustainability. For example, while progress has been reported for access to education for both boys and girls, particularly at the primary school level, millions of children in over 40 countries remain without pre-primary education. Access does not necessarily mean quality of education or even completion of primary school leaving over 100 million youth worldwide without basic literacy skills. More than 60 percent of those lacking basic skills are women which puts Target 1 of Goal #4 (to ensure that, by 2030, all girls and boys complete free, equitable, and quality primary and secondary education) in jeopardy. Indicators for SDG Goal #4 targets for learning outcomes (target 1), early childhood education (target 2), and effective learning environments rely on incomplete and aggregate data, making it difficult to analyze and identify the children at greatest risk of being left behind. This one example highlights some of the challenges with a global evaluation process that depends upon local data and local implementation under voluntary reporting and in the absence of context-sensitive global oversight. In recognition of this potential

vulnerability in achieving the SDGs, during 2014 the UN called for gathering more information from countries about how non-state actors can contribute to all the SDGs, including quality education.

In July 2017, the High Level Political Forum on Sustainable Development (HLPF)was held in New York City under the auspices of the Economic and Social Council, ECOCOC. One session featured the Higher Education Sustainability Initiative (HESI), a partnership between United Nations Department of Economic and Social Affairs, UNESCO, United Nations Environment, UN Global Compact's Principles for Responsible Management Education (PRME) initiative, United Nations University (UNU), UN-HABITAT and UNCTAD. HESI was created in 2012 in the run-up to the United Nations Conference on Sustainable Development (Rio+20). With commitments from over 300 universities from around the world, HESI accounted for more than one-third of all the voluntary commitments that were launched at Rio+20. Through its strong association with the United Nations, HESI provides higher education institutions with a unique interface between higher education, science, and policy making.

The HESI sessions targeted government officials, academia, university administrators, UN representatives, sustainability professionals, major groups and other relevant stakeholders.

The 2017 meeting of HESI at the HLPF showcased how the 2030 Agenda for Sustainable Development, including the SDGs, is being integrating into sustainability strategies, research, teaching, pedagogy, and campus practices, and to position higher education institutions as key drivers for achieving the SDGs. Throughout, it was stressed that partnerships will be the only way to achieve the central vision of SDGs. Four categories were defined by HESI:

1. Teach sustainable development across all disciplines of study
2. Encourage research and dissemination of sustainable development knowledge
3. Green campuses and support local sustainability efforts
4. Engage and share information with international networks.

While international and national level declarations are important attestations of high-level support, outcomes from meaningful environmental education in creating preferable outcomes to climate and other environmental change play out at local levels illustrating how everyone's "global" is someone else's "local." While there is no endpoint to environmental and social change, research points to behaviors with the largest potential benefits having a requirement of political engagement that is developed through experiences associated with young people's interests in public issues (Chawla, 2007). Often beginning with personal actions like those in the

home or in public arena like schools and communities, these experiences require a personal sense of competence and a sense of collective competence, or confidence in one's ability to achieve goals by working with a group.

Youth Development Within the Multilateral Arena in Parallel to the SDGs

Against the backdrop of the dialogues about youth and sustainable development leading up to the 2015 release of the SDGs, youth had been developing an increasingly sophisticated international climate and sustainability policy voice through their formally recognized constituency at the UNFCCC. In 2009, youth were denied access to the COP15 premises in Copenhagen and responded by stripping down to their underwear and jumping up and down in the snow chanting "don't leave youth out in the cold!" Five years later at the 2014 COP20 Youth Day, the official Youth Constituency presented "Intergenerational Inquiry: Youth as Agents of Change," inside the negotiating venue, pointing to how youth are self-organizing to take on climate change governance and actions such as in the 2014 New York City HLPF climate meetings, and calling on global youth to participate in community government events. Youth are exuberant and even dramatic. These presenters were no exception, exhibiting emotional despair at the state of the environment and what that means to their future. The Brazilian representative railed at the people in the room that "the men of paper are the new men of war," while the Danish Youth Council representative pointed to the professional audience proclaiming that "You have condemned us to an uncertain future" (Wilson, 2014).

Alongside the admonitions to older generations, other youth participants offered suggestions. World Scout representative Nathan Nguyen reminded the audience that among the issues youth face is the issue of meaningful participation and that to have that kind of participation, youth need to work with older people. Others chimed in that while youth from the Global North had well prepared statements for governments, those from the Global South were ill-prepared and the differences in global ideologies were threatening the opportunities for dialogue. Youth colleagues called for increasing global awareness among all youth regarding the science and the social implications of inaction or maladaptation so that the youth perspective can explicitly contribute to solutions whether at the UN or in their local communities. At COP23 hosted by Fiji, youth leader Timothy Damon presented as part of a panel in the host country's Pavilion about the transformational abilities and unique contributions of youth in building resilience when provided with the knowledge, training and opportunities from older generations (Wilson, 2017).

Outside the UN, educators had been laying the groundwork for the youth platform far before COP20, claiming that inaction on climate change is a dangerous and improper action that is a detriment to resilience and sustainability. Environmental education is a recently evolved academic field; climate change education is newer still and fraught with the expected controversy surrounding a new far-reaching discipline (Schreiner, 2005). In 1968 the United Nations Educational, Scientific and Cultural Organization (UNESCO) called for curriculum development in environmental education at all grade levels and the stimulation of global awareness to environmental problems (Palmer 2001). As the Millennium Development Goals (MDGs) morphed into the Sustainable Development Goals (SDGs) in 2015, climate change as a focal point for youth action increasingly targeted initiatives such as UNEP and UNESCO's *youthXchange* guidebooks that enable educators and young people to personalize learning and climate change resilience actions (Anderson 2012). Those actions range widely from public health to ocean acidification, multilateral processes, collaboration and conflict, international capacity development, climate equity, green building, food security, insurance, finance and business, sustainable development and disaster risk reduction.

A roundtable which was overseen by the U.S. Board on Science Education, the Board on Environmental Change and Society, and the Division on Earth and Life Studies, met during a recent workshop to focus on the teaching and learning of climate change and climate science in formal education settings (National Resources Council 2012). Participants linked formal education to the necessary links between scientific and technical analysis with public deliberation and decision making as stated in America's Climate Choices (National Resources Council 2011) as critical to effective responses to sustainability that results in resilience in which citizens understand the risks of both action and inaction and to engage in effective deliberation about all available choices.

This short chronicle demonstrates how the evolving relationship between education and the SDGs clarifies the roles and responsibilities for education in achieving the Sustainable Development Goals. Through experience, the editors of this volume know that the most effective sustainability work is, as Sea Trust Institute says, "Local to Global and Back Again $^{(SM)}$." Engaging youth with the science, engineering, social and policy processes that make their community more resilient to environmental change creates an opportunity for global dialogue and focuses this text on developing a deeper understanding of social learning in the transition from awareness to action. Opportunities for youth in engaging with the SDGs may be as change-makers who act and catalyze others, critical thinkers who question and challenge power structures and barriers to change, communicators who take the messages of agreement and impasse to peers and communities, innovators who bring fresh ideas and alternative approaches, and as leaders who are prepared to take their place at the head of discussions and actions at all levels.

EXPLORING HOW ENVIRONMENTAL EDUCATION IMPACTS LOCAL AND GLOBAL RESILIENCE DEVELOPMENT

At the highest risk for climate change disasters are the world's poorest people. Most of these are youth, under age 24, who make up nearly half of the world's population with most living in developing countries. These young people have a significant role to play in creating a sustainable and resilient future. Education makes regional and international interdisciplinary scientific research, education and policy accessible for building resilience to climate change at local and global levels. This book, *Building Sustainability Through Environmental Education,* demonstrates ways in which education can be used to impact both sustainability and resilience to environmental and social change.

Both sustainability and resilience require reconciliation of environmental, social equity and economic demands - often referred to as the "three pillars" of sustainability. Together, these comprise the definition of the general subject area. Diverse contributions to the book allow readers to understand new theoretical and practical approaches emerging from current research and identify ways to adapt or transfer them across sectors, geography, ecosystems and cultures. Authors utilize an interdisciplinary approach, blending environmental and climate science with social, political and economic knowledge impacting local conditions on topics ranging from adaptation and resilience in developing countries to the role of experiential and designed learning spaces, science communication, vulnerability, roles of different players in promoting sustainability, and a thought experiment about environmental education in the postnormal future. Chapters highlight case studies, analyses and descriptions of scientific, use-inspired research projects of interest to policy-makers, scientists, environmental and civic leaders and the public to demonstrate what it means to promote climate change awareness for a new generation of environmental leaders. Each author places their work within the context of the SDGs.

The first chapters offer a high level view of the research, principles, governance and policy issues at the nexus of education and sustainability. With emphasis on how actors across scales and sectors can positively impact resilience development in communities and government, authors explore how education impacts water security, changing environmental conditions, and community resilience in a complex future. In the next section, authors provide more in-depth analyses of conferences, educational programs and non-traditional learning spaces. Chapter authors then move into broad discussions about disaster risk learning strategies, communication, potential limits to the public sector's ability to address levels of complexity in a postnormal future, before concluding with an examination of women's empowerment through a specialized entrepreneurial approach that directly responds to the SDGs and shared global norms, and the roles of youth as change agents and catalysts for creating and sustaining resilience.

BUILDING RESILIENCE THROUGH ENVIRONMENTAL EDUCATION: A CONTRIBUTION TO THE LITERATURE

What are scholars of sustainability, policy, and environmental education discovering about the links, wise approaches, long lasting effects and pivotal changes in approaches under evolving conditions of change and uncertainty? This book is designed to address some of the gaps in that knowledge including perspectives that illuminate and resonate with messages from governments, communities, and especially youth who bring powerful new sources of information for expanding knowledge about how environmental education may best promote sustainability and resilience.

1. *Need for empirical evidence – showing examples that engage both youth and adults through environmental education* to equip them to lead and participate in resilience development action projects. Authors explore new ways to purposefully infuse education into local and global environmental decisions and actions in the face of escalating changes and challenges. Informal as well as formal learning approaches tailored to today's media culture and learning mechanisms in different settings and cultures must simultaneously address capacity building, organizational structure, and changing technologies to support resilience in a changeable and uncertain future.

Capacity—attitudes and competencies leaders need to guide, support or facilitate environmental and sustainability education to catalyze and sustain resilient communities. Examples of what constitutes a successful sustainability and environmental education project are measured through their effects on awareness, resilience and future action.

Organization—educational systems and structures that contribute to dynamic learning environments while respecting different physical, ecological, cultural, political, economic and social realities and combining perspectives to create unique outcomes suited to specific communities and situations. Potential new or augmented roles for educators, NGOs, scientists, students, businesses, government leaders, and environmental researchers to address both present crises and unknown future effects through education are considered.

Technology—effective technologies that embrace changing conditions. Flexible approaches need to be used effectively to enhance environmental educational collaborations and interactions between researchers, communities, governments, academics, and youth.

2. *Need for new perspectives on sustainability, combined environmental/ social awareness, and modes of education from academic and professional*

research for academics, practitioners, educators and governmental leaders. Different modalities of environmental education in action suggest new ways to purposefully engage education with local and global environmental decisions and actions in the face of escalating changes and challenges. Educators will use it as a tool for their own professional work and research; policy makers will use the examples as a guide to incorporating education more purposefully into environmental, climate change, and other sustainability decisions; and non-governmental organizations (NGOs) will find linkages between their mission and education that will enhance both sectors.

3. *Need for evaluating scholarly findings through the voices of young professionals and through a futures perspective* to evaluate effectiveness of theories and approaches to building resilience.

This book is meant to be thought- provoking and practically useful. By examining academic theories and studies through the lenses of resilience development and the Sustainable Development Goals, it is hoped that this book can open new channels and opportunities for cross-disciplinary exchange leading to new, innovative discoveries that empower and energize new types of leaders equipped with the elasticity and flexibility along with the knowledge required for future environmental and social resilience development. Through sharing research and experiences based around the theme of education as capability building in sustainability strategies and innovations as spelled out by the SDGs, readers of *Building Sustainability Through Environmental Education* will expand the community of scholars, practitioners and citizens to aid in our quest. We invite you to generate new dialogue, study, and collaborative practices that promote resilience to the current and coming changes, and to assist young people in achieving their full potentials as leaders in this important academic and social pursuit.

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Figure 1.

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