



# The Context: SDGs and Institutions of Higher Education

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## 1.1 Introduction

The year 2015 was significant in many respects as it marked the conclusion of agreements defining a number of important global development agendas. Foremost among these agendas are the Addis Ababa Action Agenda on development finance and means of implementation (United Nations 2015a), the 2030 Agenda for Sustainable Development (AfSD) and its 17 indivisible Sustainable Development Goals (SDGs) (United Nations 2015b) and the Paris Agreement (United Nations Framework Convention on Climate Change—UNFCCC 2015). Complementing these important agendas are other global development agendas that came up just before and immediately after 2015 that have a huge bearing on the implementation of the SDGs in institutions of higher education (IHE). These development agendas are, notably: The Sendai Framework for Disaster Risk Reduction running from 2015 to 2030 (United Nations 2014), the United Nations Educational, Scientific and Cultural Organization (UNESCO), Global Action

Programme on Education for Sustainable Development (UNESCO 2014) and the New Urban Agenda from the United Nations' Habitat III (United Nations 2016).

To the researchers and IHE in particular, these agenda avail an endless list of opportunities to contribute both academically and practically to the various converging objectives of these agendas. Against this background, there is certainly a case for reflection on the implementation of the 2030 AfSD and its SDGs, which is the focus of this publication. Across the globe, the challenge of localising the SDGs in terms of national development priorities requires a combination of technical, scientific as well as administrative and political input. It is clear that a collaborative approach is needed in order to stay true to the SDG's inclusive and bottom-up approach. Of particular interest is the notion that the SDGs represent a development agenda that should be realised by both developed and developing countries. This provides IHE with a novel opportunity to collect and share insights and good practices. Hence through the SDGs, the world hopes to conclude by 2030, the unfinished business of the Millennium Development Goals (MDGs). The SDGs are documented as a co-created plan of action for global citizens, the planet, and prosperity (United Nations 2015b).

The IHE have a crucial role to play in meeting the sustainable development challenges by going beyond advancing training and skills

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development. The IHE must not only produce excellent teachers, but ‘uncover ground-breaking research, and connect services to communities’ (Owens 2017: 418). This is because IHE generally remain on neutral grounds in the eyes of several stakeholders and are one of the key drivers of economic, social, and other forms of progress of any given country (Utama et al. 2018). In this context, IHE are encouraged to develop management systems based on the principles embedded in the SDGs (Box 1.1).

Overall, Utama et al. (2018) presents five strategies that may facilitate a swift movement making IHE realise the localisation of SDGs quicker. These strategies include the improvement of IHE quality, equity, sanitation and environment, research and innovation, and partnerships both locally and globally. Notwithstanding the fact that apart from the broader SDGs agenda, there is a specific SDG (SDG 4) targeting IHE. This SDG has ten targets and a number of indicators. Some of the targets directed at IHE include the following (United Nations 2015b: 17):

- By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university.
- By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.
- By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous people and children in vulnerable situations.
- By 2020, substantially expand globally the number of scholarships available to developing countries for enrolment in higher education.

The IHE are at the forefront of creating and co-creating knowledge, coming up with innovations and discoveries, yet in many cases the outcomes of the efforts of IHE such technological powers

#### Box 1.1: Abridged Version of the SDGs

- Goal 1: End poverty in all its forms everywhere.
- Goal 2: End hunger, achieve food security and improve nutrition and promote sustainable agriculture.
- Goal 3: Ensure healthy lives and promote well-being for all at all ages.
- Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
- Goal 5: Achieve gender equality and empower all women and girls.
- Goal 6: Ensure availability and sustainable management of water and sanitation for all.
- Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all.
- Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
- Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.
- Goal 10: Reduce inequality within and among countries.
- Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable.
- Goal 12: Ensure sustainable consumption and production patterns.
- Goal 13: Take urgent action to combat climate change and its impacts.<sup>1</sup>
- Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
- Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems,

(continued)

<sup>1</sup>Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

- Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
- Goal 17: Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development.

Source: United Nations (2015b: 14)

are hardly implemented within campuses. A broader understanding on the role of IHE in the SDGs space reinforces the notion of socially responsible IHE, moving away from conventional debates on quality, financing, and student mobility (Tandon 2017). Through conceptualising IHE as socially responsible institutions, the capacity deficits in achieving the SDGs that include lack of sustained political support from governments, inadequate resources, institutional and human capacity, and knowledge deficit can be addressed.

The involvement of IHE in SDGs localisation from a social responsibility view point can be addressed through the three co-mandates of IHE namely: teaching and learning; research and development; and engaged scholarship (sometimes referred to as community engagement or service to the community) (Nhamo 2012). The interaction between these mandates is complex both conceptually and practically. Since there remains contestation as to whether engaged scholarship should be a separate or integral pillar to the other two pillars (Nhamo 2013a), this book takes the view that engaged scholarship remains an integral element of the other two pillars. Agbedahin (2019) and Boni et al. (2016) add to the complexity and highlights that a focus on SDGs localisation in IHE will be incomplete without considering the intertwining between education, sustainable development, human development, and education for sustainable

development. English and Carlsen (2019) add the lifelong learning dimension from SDG 4 seen as pivotal in the attainment of many other SDGs. The authors highlight five other SDGs with a strong link to lifelong learning, namely SDGs 3, 5, 12 and 13.

This book seeks to present case studies related to how the IHE have been involved in localising the SDGs. Seeking to accelerate the localisation of the SDGs in IHE, the book brings together both theoretical and case study-based contributions to the implementation of SDGs. The next three sections are dedicated to documenting how IHE can localise the SDGs within the twin pillars of teaching and learning; and research and development as well as general SDGs localisation outside the highlighted pillars.

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## 1.2 SDGs Localisation in the Teaching and Learning Space

Tandon (2017) advises on a number of practical steps could be undertaken by IHE to embed SDGs in the teaching and learning space. The author identifies three such pathways as curriculum revisions, the introduction of new courses and engaged pedagogy. Regarding curriculum revisions, the argument is that existing syllabus and curriculum may be adjusted and updated enhancing new perspectives from the SDGs not considered in the old curriculum. From the engaged pedagogy perspectives, teaching of many of the SDGs could take place out of the lecture rooms and practically demonstrated within community set-ups. For example, agricultural faculties may wish to get into the communities when teaching about organic farming and traditional food conservation habits that address SDG 2.

One key area of interest forms the IHE perspectives is the United Nations' Principles for Responsible Management Education (UN PRME). Weybrecht (2017) explores the crucial role of UN PRME in sustainability and SDGs localisation. In the author's view, business schools globally should take responsibility in translating the global development trajectory

from the SDGs into tangible solutions that resonate with communities in which they operate. This implies integrating the SDGs agenda into business schools' curriculum. This is important for a future where it is possible to reach a common global view that addressing the SDGs may be an unwritten license to operate. The SDGs may also be used as a platform for business schools to engage their external stakeholders, assisting them to further localise the SDGs in their own operations. Weybrecht (2017), however, contends that management education has not fully embraced the SDGs and proposes a four-step sustainability engagement framework. The framework looks at: (1) setting the scene, (2) integrating (embedding, collaborating and contributing), (3) identification of unique engagement points and (4) providing an enabling environment. Storey et al. (2017) concur with the view of a limited response of PRME with regard to the SDGs. The authors are of the opinion that PRME remains cluttered and fluid. In contrast, the SDGs agenda is enhancing a collective direction. This is evident in the SDG-centred mission statement posted by the UN PRME in 2016. This change in posture from UN PRME resulted from the 2015 Global Forum for PRME that took place on the side-lines of the United Nations SDGs Summit in New York.

**Table 1.1** Ways IHE are engaging the SDGs in the teaching and learning space

Organisation	SDGs initiative
Curtin University	Doctorate in Sustainable Development for the SDGs
The University of Sydney	Teaching SDG 1 (End poverty in all its forms everywhere)
Victoria University of Wellington	Mapping curriculum through the SDGs
University of South Africa	Sustainable Development Goals for Society (SDGs4S) Research Stream Inauguration of the localisation of SDGs in institutions of higher education public lecture series through the Exxaro Research Chair in Business and Climate Change
University of Pretoria, South Africa	South Africa's SDGs hub offering Africa's first multidisciplinary postgraduate degree on the SDGs

Source: Modified after SDSN Australia/Pacific (2017: 47–52)

Participants to the Global Forum for PRME requested key stakeholders, among them governments, business leaders and the United Nations agencies to give support to PRME in developing future leaders that would assist in attaining the SDGs (Parkes et al. 2017).

Several examples of ways in which IHE are engaging with the SDGs in the teaching and learning space are emerging. Some of these examples are presented in Table 1.1.

Table 1.1 shows the diversity of approaches. What is important is that despite this diversity, there is a common goal and capacity as well resources availability determines the trajectory and its form.

### 1.3 SDGs Localisation in the Research and Development Space

Tandon (2017) suggests what needs to be done in IHE regarding SDGs localisation in research and development spaces. The author identifies the first port of call as the contribution of new knowledge on how the world may achieve the set objectives of the SDGs. However, the emerging work on SDGs baselines (Nhamo et al. 2018, 2019) reflect that many countries lack appropriate baselines to measure, report and verify (MRV) progress on SDGs. Additional insights from this work is on huge data gaps for the indicators spelt out for MRV that require Big Data.

Tandon (2017) proposes three practical ways by which IHE can make research and development contribute meaningfully to understanding SDGs namely: (1) framing locally usable research; (2) co-production of knowledge through partnerships and (3) learning new competencies. Both the students and staff (teachers and mentors) are encouraged to frame policy and context research questions. Given the different forms of governance between countries, SDGs-related research questions ought to define and address challenges from the global, regional, national, state or provincial, local and company-specific context(s). For example, a number of questions may arise. How can IHE research address matters of extreme weather events resulting from climate

change that negatively affects human settlements and ecosystems? How can the research show the linkages between the SDGs? Floods and droughts, for example, bring suffering in municipalities and households, affecting vulnerable individuals. Hence, research contributing to building climate resilient cities, communities and households remains paramount in this generation, thereby addressing both SDG 11 that focus on building sustainable human settlements and cities and SDG 13 that demand proactive climate action.

The co-creation of research agendas on SDGs by IHE cannot be over emphasised. The key actors at any given time in a society include government, business, development and donor community as well as civil society. Stakeholders have different interests and views of societal challenges. In addition, the intensity of their views and willingness to participate in agenda-setting discourses that seek to address the challenges also differ. Nevertheless, whenever there is a need for developing a societal challenge-solving and/or understanding research agenda for IHE, these key stakeholders should be consulted to enhance buy in and acceptance of emerging solutions and approaches to solve defined challenges. In addition, such consultations have the added advantage of unlocking financial and other resources that IHE may not have. This research approach may also contribute in refining data generation protocols for Big Data that is central to MRV in SDGs. Partnering with municipalities or any other entities in assisting them to build model SDGs localisation entities remains a huge research and development agenda. From such partnerships, multidisciplinary research teams can be assembled and deployed in fulfilling several requirements in scaling up SDGs implementation. This is important, as Tandon (2017) has identified gaps showing that the SDGs could have brought in new areas of research that demand researchers to learn and build new areas of competencies. A case in point once more is the language of Big Data propelled under the SDGs era. Learning new competencies may require students and staff to collaborate with other IHE, building lasting partnerships for SDGs and personal competencies. In this context, the development of Massive Open Online Courses (MOOCs) (Nhamo 2013b) remains a platform for research and development

as well as teaching and learning for SDGs. Several examples of ways in which academics are engaging the SDGs have emerged (Table 1.2).

Once more, Table 1.2 shows a diversity of approach emphasising the established fact of many approaches to meeting a common goal. More of such approaches are encouraged now and into the future.

**Table 1.2** Ways IHE are engaging the SDGs in the research space

Organisation	SDGs initiative
Academy of Science, South Africa (ASSAf)	Including SDGs in academy's Annual Performance Plan, Annual Report and Strategic Plan
Science Council of Japan (SCJ)	Setting up expert committee on SDGs
Swiss Academy of Sciences (SCNAT)	Incentivising universities through SDG focused programmes
The World Academy of Sciences (TWAS)	Aligning prizes and/or awards to SDGs
Global Young Academy (GYA)	Using SDG-referenced Working Groups
Academy of Sciences, Malaysia (ASM)	Running flagship studies in sustainable development research and developing a national Science, Technology and Innovation plan for the SDGs
Thai Academy of Science and Technology (TAST)	Holding (bi) annual members' meetings on SDG-relevant themes
Chinese Academy of Sciences (CAS)	Commissioning national sustainability reports
Zambian Academy of Sciences (ZaAS)	Organising live television phone-ins on SDG-relevant issues
The University of Queensland	Achieving SDG 6 discussion paper series
The University of Technology, Sydney	The UTS Development Network
Victoria University of Wellington	SDG Ideation Forum
The University of Western Australia	SDG research website
Monash University	Safe Families Research Study
Institute for Sustainable Futures, University of Technology, Sydney	Mapping research to the SDGs

(continued)

**Table 1.2** (continued)

Organisation	SDGs initiative
Curtin University Sustainability Policy Institute	Western Australia's SDG Network
Sustainable Development Solutions Network Australia/Pacific	Leading SDG localisation in Australia
University of South Africa	Inauguration of the Cyclones, Floods and SDGs Research Group in southern Africa Proposal development, coordination and ultimate publication of this book on SDGs and Institutions of Higher Education in partnership with Springer Proposal development, coordination and ultimate publication of another book in the series titled Scaling up SDGs Implementation in partnership with Springer

Source: Modified after InterAcademy Partnership (2017: 12–13) and SDSN Australia/Pacific (2017: 47–52)

#### 1.4 SDGs Localisation in IHE: Focus on Governance and Management

In addition to the twin pillars and mandate of IHE discussed earlier to which SDGs localisation takes place, De Vall and Pubill (2018) bring additional concepts of governance and management. Governance looks at incorporating the principles of SDGs into institutional culture and the way in which IHE are regulated through policies, protocols and procedures. This should be complemented by the management, which looks at fostering a sustainable campus management and operations. In fact, the authors go further challenging IHE to acknowledge their unsustainable pathways that result in environmental degradation through their huge carbon footprints. This makes the actions for good environmental stewardship in IHE campuses regarding water, energy, transport and waste management paramount.

The Sustainable Development Solutions Network (SDSN) Australia/Pacific (2017) presents a guide on getting started with the SDGs in IHE.

In this guide, the authors propose a five-stage approach to localising SDGs. The first stage is to map what IHE will already be doing. This is followed by building capacity and ownership of the SDGs, then the identification of priorities, opportunities and gaps. The fourth stage involves the integration, implementation and embedding the SDGs in all practice, with the last and fifth stage focusing on monitoring, evaluation and communication. These stages and/or parts of the stages are further discussed in some chapters of this book.

As matters of SDGs localisation in IHE continue to grow, questions are also emerging on how the IHE themselves are addressing some of the SDGs. SDG 5 (gender) quickly comes to the fore. Oludayo et al. (2019) focus on gender disparity in admissions into IHE in Nigeria using empirical data for the period (2010–2015). The authors are convinced that gender equality in accessing IHE is a crucial factor to building a sustainable world and future. The authors further acknowledge that although a number of countries across the globe have attained gender parity in primary education, this has not been the case for IHE. An analysis of data on enrolments across IHE in Nigeria confirms that indeed, females are still disadvantaged. In 2010, females comprised 41% of total enrolments in IHE and this figure improved slightly to 43% in 2015. The 2015 figure becomes a good baseline for localising SDG 5 in IHE in Nigeria and it remains to be witnessed if the 2030 target on gender parity will be achieved. Another study on gender and IHE implores the institutions to look at themselves as platforms for capacity development to address violence against women and promote gender quality. In Sweden, twin measures are now in place to realise: (1) the inclusion of gender equality as a measurable outcome in IHE quality assurance and (2) the amendment of the Swedish Higher Education Ordinance to embed mandatory knowledge of violence against women in the degree programme of seven selected relevant professional groups.

The localisation of SDGs in IHE should not take place haphazardly. For greater efficacy, a systemic approach will always work better. Given

this background, a number of IHE have started this journey. Among such are the University of the West of England (UWE), Bristol in the United Kingdom. In coming up with its roadmap to localise the SDGs, the UWE (2016) started from its structure that is organised around four faculties namely: Arts, Creative Industries and Education; Business and Law; Environment and Technology; and Health and Applied Sciences. In this journey, the UWE further draws from its already existing 2020 Sustainability Plan that sets out the UWE's ambition to become a sustainable university and a roadmap spelt out and approved by the university's Sustainability Board on 19 April 2016. The roadmap is code-named 'Meeting the UN Sustainable Development Goals: the contribution of the University of the West of England, Bristol'. The Sustainability Plan comes in three main categories focusing on Enhancing the Staff and Student Experience, Education for Sustainable Development and Resource Effectiveness. Each of the categories is further subdivided into 11 themes with high-level aims, key performance indicators (KPIs) and targets. The UWE management then audited and parcelled out what each of the faculties was doing and should do in order to contribute to the SDGs and plans for the university to make a significant contribution to each of the 17 SDGs.

Elsewhere, Okayama University (2017) is now deliberately using the SDGs as a common language for communicating the university's activities to the world. The communication permits the university to visualise its effort and press towards building new partnerships with both its local and international stakeholders. Among some of the case studies profiled are: the developing of plants adapting to climate change, supporting town development, and the promotion of science and technology innovation. The matter of partnerships with government and communities is also raised by El-Jardali et al. (2018), who acknowledge the changing role of universities in the SDGs era. However, for this changing role of universities to be fully realised and be of benefit to other stakeholders, there is a need to change the mind-sets and culture by all key actors, among them, governments and the private sector.

A sustained dialogue remains the lubricant for the success.

In as much as there is excitement over the localisation of SDGs by IHE, El-Jardali et al. (2018) offer some advice. The authors believe there is a risk of SDGs 'fatigue' that may result in IHE going back to the silo approaches to development. Despite the fact that this extreme case or retrogression could be true, a number of IHE, particularly those from developing countries are still embracing the SDGs agenda and support its objectives (Albareda-Tiana et al. 2018). The next and last section in this chapter presents the book outline.

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## 1.5 Book Outline

This book comes in 16 chapters inclusive of this introduction and conclusion chapters. Chapter 2 looks at how the University of Helsinki is moving towards realising the SDGs. The authors indicate that Universities such as Helsinki are facing a growing trend to redefine their strategies and organisation to align to sustainability requirements. However, the process of building the structures for sustainability research and education requires the breaking down of existing disciplinary silos. The chapter then analyses the new initiatives in research, education and governance, and management operations to which the University committed during 2015–2018 through the SDGs lens. The results show that SDG 4 (Quality Education) is an overarching goal represented in all new initiatives within research, education and university management. SDG 17 (Partnerships) and SDG 3 (Health and Wellbeing) are also equally strongly emphasised. However, SDGs 1 (No Poverty), SDG 6 (Clean Water and Sanitation) and SDG 5 (Gender Equality) are not considered, or if so, given little emphasis. The analysis further revealed that small niche innovations, tactical and operational activities at the grassroots level like networks, science activism and student awareness pushed for regime-level changes. However, the financial incentives and policy changes initiated on the regime level enabled the niche-level innovations to develop

and lead to strategic decisions providing a window of opportunity to initiate structural changes.

In Chap. 3, emphasis is placed on how IHE are dealing with SDG 7 with a focus on policies and projects from the University of South Africa (UNISA). The chapter highlights that as the world continues moving along sustainability pathways, higher education cannot be left behind. The chapter emerges from a lived experience by a staff member whom, together with colleagues embarked on a roadmap for addressing energy efficiency, alternative energy and carbon management within UNISA. Through Participatory Action Research (PAR), the chapter documents processes leading to the finalisation and subsequent implementation of UNISA's Energy and Carbon Policy. Three cycles informed by PAR emerged namely: the development and approval by management of a Unisa roadmap entitled the Green Economy and Sustainability Engagement Model (Cycle 1: 2012–2013); seeking outside partnerships and funding to develop the Unisa Energy Master Plan alongside the Unisa Energy and Carbon Policy (Cycle 2: 2014–16) and ongoing projects implementation and scaling up in energy efficiency and solar technologies (Cycle 3: 2017–2019). Based on the positives coming up, one would recommend the Unisa model to other higher education institutions in South Africa and beyond as this model is functioning well.

'Build It and They Will Come: The Faculty Learning Community Approach to Infusing the Curriculum with Sustainability Content' is the subject matter in Chap. 4. For those working towards infusing higher education curricula with sustainability content, the sustainability-based faculty learning community (SFLC) model structured around the United Nations (UN) Sustainable Development Goals (SDGs) is said to provide an effective non-prescriptive platform to promote both understanding of systems thinking and the SDGs. The SFLC also encourage course revision and development that include class content relevant to the SDGs. Designed for a small cohort of faculty fellows each year, the SFLC is a low-cost opportunity for institutions to encourage faculty to learn about the SDGs and apply them to their

teaching, provide them with institutional support and the freedom to venture outside of their particular academic disciplines, formally connect with community partners, and to aid professional development by helping instructors reimagine their teaching and research as place-based and regionally relevant. The aim of this chapter is to provide an overview and brief history of the SFLC specifically the Ponderosa/Piedmont model, and then present in more detail a case study of the creation and development of the SFLC at SUNY New Paltz in New York. The write-up starts from the inception of the idea, to the most recent assessment of results and plans for the future in the Hudson Valley.

Chapter 5 addresses 'Urban Metabolism and Minority Pulse: An Education and Awareness Campaign Targeting Minority Groups'. The chapter uses the SDGs as a common language to educate vulnerable members of society through tailored method solutions, educational criteria and interdisciplinary approaches. The chapter provides a replicable policy toolkit to target underrepresented populations. The case study covered the cities of Mantova and Milan, Italy. Seven identified target groups: children, elderly, people with disabilities, students and academics, women, LGBTI+, and homeless and refugees. This study designs methodology toolkits to develop awareness of urban metabolism, climate change, and resource consumption behaviours with reference to SDG 4, SDG 12 and SDG 13. Phase I consists of a campus-wide awareness initiative to create interdepartmental networks of students, researchers, and professionals studying sustainability issues. Phase II implements community-based workshops, training courses, and educational programmes targeting minority. Phase III includes guidelines to inform institutions on the importance of developing synergies between citizens, public and private entities, and minorities in strategy design.

The integration of core sustainability meta-competencies and SDGs across the silos in curriculum and professional development are the subject matter in Chap. 6. The chapter presents examples using guided inquiry with peer-to-peer learning with team wiki projects, case studies,



SDGs and reflection essays using Digication ePortfolio, Blackboard and self-assessment exercises and instruments. The authors present interesting comparisons of the New Ecological Paradigm—Revised instrument metrics and the Sulitest Sustainability Literacy self-assessment before and after the course for classes and individuals. Limitations of these instruments and alternative quantitative and qualitative instruments are discussed. A faculty development workshop template for sustainability across the curriculum with the sustainability meta-competencies and SDGs has been developed from this experience and an Association for the Advancement of Sustainability and Higher Education (AASHE) inter- and multidisciplinary bioregion faculty development workshop template.

Chapter 7 narrows down to assessing the role of IHE in the implementation and/or support of SDGs. The IHE play an important, multi-faceted role in this new global development agenda, which strives to eradicate poverty, while addressing social needs such as education, health, social protection, job opportunities, climate change, food security and environmental protection. All these areas, and more, are reflected in the 17 SDGs. This chapter provides an assessment of good practices, actors and activities in the implementation of the SDGs in IHE in South Africa, Zimbabwe and Nigeria. The output of this assessment is the generation of an understanding of the extent to which IHE curricula and their implementation satisfy students' sustainability-related knowledge and skills to be able to successfully deal with the current and future global socio-economic and environmental sustainability challenges. The study identifies the types of institutional arrangements that appear to be particularly conducive to mainstream SDGs as well as challenges in the implementation of the SDGs and recommends how IHE may advance. This qualitative study uses a content analysis of documents to look deeply into institutional characteristics of the case studies, as well as interviews with key informants in the sector.

Chapter 8 focuses on the role of universities towards achieving climate change-related SDGs

and draws from a case study of Chinhoyi University of Technology (CUT) in Zimbabwe. The authors see universities as uniquely placed to broker links between different development sectors and policy domains through fostering cross-cutting approaches to achieving the climate change-related SDGs. As such, the chapter documents the extent to which CUT has been contributing towards achieving the climate change-related SDGs, specifically SDG 13 through research, community engagement and teaching. The chapter relied on desktop reviews of grey literature produced by the university in the form of reports, research records and the CUT database. The data was interpreted using content analysis. Findings indicate that the university offers modules with components on climate change, especially in the School of Agricultural Sciences and Technology as well as School of Wildlife Ecology and Conservation. The study also found that apart from taught degree programmes, some academics collaborate internally and with external stakeholders towards research activities and community programmes, which contribute towards climate change science, adaptation, mitigation and resilience in Zimbabwe and Africa. CUT can be used as a model on how universities can translate climate-related research into policy and action through fostering linkages between academics and other stakeholders towards climate smart development initiatives.

The opportunity to foster urban innovation through universities and a focus on the city of Madrid is documented in Chap. 9. Literature shows that not only disciplinary expertise is needed, but also the ability to deal with systemic problems involving a diversity of stakeholders, with varying levels of power to design and implement solutions. It is imperative for the higher education institutions to interact with a range of actors, inside and outside the academic community, and to take into account diverse mental frameworks, languages, cultures and interests. The Innovation and Technology for Development Centre at the Technical University of Madrid (itdUPM) has successfully created a multidisciplinary collaborative network of internal and external professionals to promote action research

and education for sustainable development. One of the ongoing interdisciplinary projects is a living lab (PlatformA) designed in collaboration with the Massachusetts Institute of Technology (MIT) Center for Collective Intelligence (CCI) and MIT Climate CoLab to foster sustainable innovation in the city of Madrid. Through the fostering and sharing of processes between public and private stakeholders, PlatformA takes an innovative approach with the ultimate hope that it will boost a novel multi-actor partnership towards sustainable transformations and the Global 2030 Agenda for sustainable development and its accompanying 17 SDGs.

Chapter 10 deliberates on the enhancement of roles and responsibilities of IHE in implementing the Sustainable Development Goals (SDGs). The SDGs represent a shift to ensure that sustainable development becomes the prevailing paradigm in transforming society and protecting the natural environment. The 2030 Agenda reaffirms the notion of working together in partnerships. The IHE in southern Africa can therefore inspire future leaders to have innovative skills and mindsets of transforming societies by engaging in impactful research and embodying sustainability practices. The institutions can achieve this through promoting interdisciplinary work and problem-based learning experiences. A conceptual orientation to problems that confront IHE is required to help clarify practices that characterise these institutions in achieving the desired sustainability. This chapter explores IHE processes, aimed at escalating their roles and responsibilities in effectively implementing SDGs. The chapter is guided by three questions: (1) what are the implied roles and responsibilities of IHE in SDGs implementation? (2) How can IHE demonstrate participatory approaches towards effective sustainability processes and (3) How can IHE strengthen existing partnerships to enhance the implementation of SDGs? In addressing these questions, the chapter articulates underlying problems and existing gaps in IHE processes with a view of initiating reforms that have an effect on enabling SDGs implementation. This may help identify knowledge gaps on sustainability, hence enabling IHE to initiate forums that

bring together relevant stakeholders to co-engage on best practices.

Chapter 11 looks at University Environmental Hackathons and how these can further the SDGs. Even as hackathons expand in scope and scale, participants and problems still remain primarily those within or entering the field of software engineering. To apply the hackathon innovation model, incorporating rapid prototyping and development, to environmental problems, Earth Hacks was created. This chapter discusses the creation of Earth Hacks, a purpose-driven interdisciplinary hackathon focused on generating innovative, actionable solutions to pressing environmental problems. The authors detail the multidisciplinary approach they integrated into Earth Hacks events from the onset of the planning and ideation processes, as well as how they structure judging criteria to be able to take into account the multidisciplinary nature of the projects. They discuss the ideation process and organisational structure of Earth Hacks events, as well as strategies to make hackathon follow up successful. The authors believe that hackathons can be a powerful tool to advance the SDGs and hope to be able to create a global community of student leaders dedicated to breaking down barriers in tech and applying their skills to solving environmental problems.

'Learning and Teaching Practices promoting Education for Sustainable Development: Case studies from Social Studies and Language Education from the University of Botswana' makes up Chap. 12. The successful achievement of the goals of education for sustainable development (ESD) primarily depend on the nature of the curriculum, teaching and learning approaches, assessment practices and teacher commitment. Research shows that, although secondary school teachers are expected to infuse global issues in their respective teaching subjects at secondary school level, in Botswana, many of them are unable to do so. Teacher education programmes are blamed for not equipping them with the knowledge and skills needed to integrate such issues into their disciplines. The aim of this chapter is to share attempts made by two teacher education instructors in incorporating ESD in their

courses at the University of Botswana. The key questions addressed are: (1) which pedagogical approaches can be employed in humanities disciplines to embrace ESD? (2) How can students be assessed to measure the extent to which they have acquired the knowledge, skills and attributes needed to participate in sustainable development? Data for this chapter are based on document analysis and examples of practices from the authors' courses. The research adopted narrative inquiry approach gathering data whose analysis demonstrates that it is possible for instructors, to transform their pedagogical and assessment practices to embrace ESD principles.

Chapter 13 deliberates on 'Livelihood Support Programmes for Sustainable Development Goals in Rural Nigeria' with a focus on the Federal University of Agriculture, Abeokuta (FUNAAB). Nigeria extended a livelihood support programme to neighbouring villages it adopted for its Agricultural Productivity Programme (APP). The APP included training, advisory services and dissemination of some agricultural technologies. The targets of APP were to effectively tackle development challenges by increasing agricultural productivity and to reduce poverty and hunger (malnutrition) as entrenched in the first two SDGs. Four technologies were disseminated and demonstrated to the rural dwellers. The project beneficiaries were guided into personal investment using practical knowledge acquired from the demonstration. At the end of 2 years, an early impact assessment was conducted. Results revealed that the income of farmers improved from \$1.81 to \$3.76 a day from just two enterprises. Nutritious food such as vitamin A-fortified cassava, quality protein maize, fish, eggs and chicken were made available to people in the rural areas. The University-led APP intervention is an empirical way of actualising the SDG at the village level.

'Transformative Innovation Policy, SDGs and the Colombian University' are matters discussed in Chap. 14. The Transformative Innovation Policy (TIP) views the university as part of the national systems of innovation. Furthermore, higher education institutions are at the core of such policy. This chapter presents the contribu-

tion the Colombian university is making to selected SDGs. The SDGs include: SDG 4—Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all; SDG 16—Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and effective, accountable and inclusive institutions at all levels and SDG 17—Strengthen the means of implementation and revitalise the global partnership for sustainable development. The chapter describes the manner in which Colombia University was involved in drafting the National Science and Innovation Policy and document the importance of the University as a fundamental axis for a transformative structure. This is evident in the manner in which the University became a centre for the generation and dissemination of knowledge, basic and applied research, and technology transfer. Such academic activities can be aligned with the TIP by following a series of recommendations to develop a public innovation policy that contributes to the country's achievement of the 2030 Sustainable Development Agenda and its 17 interlinked SDGs.

Chapter 15 documents the adoption of the SDGs as a reporting framework at the Alma Mater Studiorum (University of Bologna) in Italy. Since 2016 the University of Bologna has been implementing an innovative strategy of measuring its performance through the Agenda 2030 for Sustainable Development and its con-voying 17 SDGs and related targets. As a large sized multi-campus system with over 86,000 students, the University has the need and the duty to harmonise the relationship between the environment and people. The SDGs have been therefore adopted as standards to measure the university's sustainability through the publishing of an annual report, included within the broader frame of its Strategic Plan. This has provided an effective push to reshape institutional and management strategies, to better plan, monitor, and strengthen accountability to stakeholders. After investigating the context, the approach has been developed, the contribution will point out the identified challenges mainly connected to the availability of data. As findings, the reports on the United

Nation's SDGs exposed the value of identifying indicators able to provide comparable results for setting IHE as central actors of change in the achievement of the SDGs. The emerging pattern shows a shift from a process of basic literacy on sustainability to a political action of inner dissemination of the culture of sustainability transitioning from a subsidiary report to a comprehensive 'AlmaGoals' initiative.

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