Mainstreaming Sustainable Housing for All

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Abstract. The One Planet SBC Programme aims at sharing good policies, tools and technologies to support mainstreaming sustainable buildings and construction practices especially in emerging economies. This paper describes first the approach of the SBC Programme supporting the international frameworks. Then, SBC Trust Fund projects are presented followed by priority working themes for 2020-2022. The tools developed in the SBC programme to help improving sustainability of affordable housing are introduced more in detail. Finally, mainstreaming of sustainability in housing is discussed showcasing also other tools emphasizing emerging markets.

1. Introduction

Adopted in 2012 at the World Summit on Sustainable Development, the 10-Year Framework of Programmes on Sustainable Consumption and Production (10YFP) is a global commitment to accelerate the shift towards sustainable consumption and production in both developed and developing countries [1]. Sustainable consumption and production have been included as a stand-alone goal (SDG 12) of the 2030 Sustainable Development agenda, and Target 12.1 calls for the implementation of the 10YFP [2]. The One Planet network has been formed to implement the commitment of the 10YFP.

The Sustainable Buildings and Construction Programme of the One Planet Network (One Planet SBC Programme) is also committed to the Paris Agreement on Climate Change [3] and the New Urban Agenda [4]. Figure 1 shows how the SBC Programme collaborates with the other One Planet Programmes, strengthens the means of implementation and revitalizes the global partnership for sustainable development (Goal 17). The priority themes focus on health (Goal 3), employment (Goal 8), innovations (Goal 9), cities (Goal 11) and climate change mitigation and adaptation (Goal 13).

SBC contributes strongly to capacity building (Goal 4), water and energy efficiency (Goals 6 and 7) as well as biodiversity (Goal 15). The programme also supports aspects like local food production (Goal 2), reduction of construction plastics (14) and corporate responsibility (Goal 16). The objective is to provide job opportunities for all genders and the youth (Goals 1, 5 and 10).
Figure 1. SBC contribution to SDGs.

This paper presents five Trust Fund projects of the SBC programme that have contributed to different aspects of sustainable buildings and construction. They are followed by a description of SBC’s strategic focus and plans towards 2020-2022. Finally, the approaches towards assessing and mainstreaming affordable sustainable housing are discussed.

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1 SDG Goodlife Goal Emojis have been shaped through a multi-stakeholder collaboration between Futerra, the 10YFP Sustainable Lifestyles and Education program, co-led by the governments of Sweden and Japan represented by the Stockholm Environment Institute (SEI) and the Institute for Global Environmental Strategies (IGES), as well as UNEP, UNESCO and WBCSD. More information: [https://sdghub.com/goodlifegoals](https://sdghub.com/goodlifegoals)
3. SBC Trust fund projects
The SBC programme started in 2015 as part of the 10YFP that was initiated in 2012. SBC aims at improving the knowledge of sustainable construction and to support and mainstream sustainable building solutions. Through the programme, all major sustainable construction activities can be brought together under the same umbrella. The work involves sharing good practices, launching implementation projects, creating cooperation networks and committing actors around the world to sustainable construction [5].

The overall aim of the SBC programme is to achieve a situation, by 2030, where all stakeholders involved in the planning, commissioning, design, construction, use, management and deconstruction of buildings and their environments have a common understanding of sustainable built environments and the knowledge, resources and incentives required to create, maintain and use them.

During its first four years 2015-2018, SBC operated on a wide range of sustainable building related topics for climate mitigation and adaptation, whilst also considering local job creation and maintenance of healthy living environments.

SBC has initiated five Trust Fund projects [6]
- Sustainable Construction Policy in the Aburrá Valley, Colombia [7]
- Mainstreaming sustainable social housing in India (MaS-SHIP) [8]
- Development of Sustainable Housing Design Tool “SHERPA” in Kenya, Burkina Faso and Nepal [9]
- Sustainability Assessment of Nabta Town (NST) and Actions for Improvement in Egypt [10]
- Responsibly Concrete Sustainability Council, Responsible Sourcing System Implementation in Costa Rica, Colombia and Panama [11]

The efforts of replicating the results of these projects and scaling them up is an ongoing task. This paper discusses specifically two of them: MaS-SHIP and SHERPA that developed tools for affordable and sustainable housing in emerging economies.

4. SBC Work plan 2019-2022
A five-year strategy [12] was defined by the One Planet network over the period 2018-2022 to become a leading implementation mechanism for SDG 12, on sustainable consumption and production. At this point the scope of the SBC programme interventions in 2019-2022 was expanded from buildings to built environment and activities targeting the two following thematic focus areas:

- Affordable and resilient built environment (ARBE); which advocates for and promotes affordable, sustainable and resilient housing construction practices, with a focus on holistic and integrated urban and community development.
- Responsibly sourced materials in circular built environments (MACE); which promotes circularity principles and approaches in the buildings and construction sector to support countries in achieving their climate commitments, environmental obligations and development objectives. Notably, these would be undertaken through the promotion of responsibly sourced materials and the reuse of different waste streams.

Each thematic focus area has a dedicated working group and a set of commonly agreed activities and targets. Through its work in each of its thematic focus areas the programme will seek to (i) make the case for SBC to countries, (ii) provide training and technical and policy guidance based on science to key stakeholders for shifting policies and actions towards the promotion of sustainable buildings and construction, and (iii) facilitate the creation of partnerships for SBC implementation as shown in the following figure.
5. Mainstreaming Affordable Sustainable Housing

The SBC programme stresses the significance of emerging markets where access to reliable data of sustainability of buildings and their components is often lacking. There are number of certification schemes that are applied globally to give ratings or provide sustainability assessments to buildings, often emphasizing their environmental component. The most widely spread schemes have been developed in industrialized countries based on technologies applied in their markets. They don’t always fit so well in other cultures, climates and traditions without appropriate customization [13], [14]. The SBC programme supported the development of two tools that can be useful in designing and constructing affordable sustainable housing in emerging economies: SHERPA [15] and MaS-SHIP [16].

5.1. SHERPA for Sustainable Housing Projects

SHERPA is a self-assessment tool that can be operated using an app which is used for carrying out comprehensive assessments of the sustainability of housing projects. It allows beneficiaries to design and implement housing-related projects with a strong and solid consideration for sustainability aspects. SHERPA also acts as a capacity building tool for beneficiaries to understand and apply sustainability concepts on all types of projects.

SHERPA assesses a housing project at the household, neighbourhood and territory scales, as well as the processes involved in inception and design to deliver a rating based on the economic, environmental, cultural and social sustainability of the project. The goal is to produce sustainable housing; by doing so, the app helps institutions and organizations in achieving the aspirations of the New Urban Agenda, the 2030 Agenda for Sustainable Development and the Paris Climate Agreement.

SHERPA views housing as a lever for sustainable development. To achieve this not only “green” technologies, but also human, social and cultural factors need to be considered within and beyond the boundary of a building. SHERPA scores responses to each question according to 12 indicators which are aligned to the four pillars of sustainability: social, economic, environmental and cultural. It functions in an open source smartphone app in English, French and Spanish. The project stakeholders organized training for the partners in Ecuador for testing the tool in Nepal, Kenya, Burkina Faso and Nicaragua.
### 5.2. Mainstreaming Sustainable Social Housing in India (MaS-SHIP)

MaS-SHIP developed a tool to support sustainable housing projects promoting sustainability in terms of environmental performance, affordability and social inclusion as an integrated part of social housing in India. MaS-SHIP Design Support Tool provides guidelines at a conceptual stage to improve the performance of the housing project. The applicability of the tool has been tested in five social housing projects to ensure that the environment, social and economic aspects in such housing are addressed and the proposed sustainable construction practices are implemented.

The tool consists of a framework of 18 attributes in collaboration with developers, practitioners and academics to measure the performance of 17 established and emerging building systems, against four criteria, including resource efficiency, operational performance, user experience, and economic impact. The findings were collated into catalogues for each material, while the methodology for calculating the mix of qualitative and quantitative attributes were developed into a new data framework.

#### Figure 3. SHERPA app. [17]

#### Figure 4. Examples of MaS-SHIP case studies [18]

A key output has been the creation of the Decision Support Tool (DST), an interactive, online tool comprising a range of outputs, datasets, tools and insights that can help prospective users in choosing sustainable building materials and making and monitoring sustainable design interventions and construction practices in social housing projects. It does not only address the absence of a comprehensive measurement framework to assess sustainable materials, but also includes design guidelines to ensure sustainability is embedded at the concept stage of a housing project.
Through the development of a Sustainability Assessment Tool (SAT), it fills missing data that is needed to quantify the performance, and using material mapping application, spatially maps the availability of sustainable building systems options. As a key component of the DST, SAT has the capability to measure the relative performance of building materials and systems for social housing projects that do not exceed four stories, using the framework of 18 attributes. Filling these knowledge gaps can assist in prioritizing sustainability considerations in housing policy and implementation.

5.3. Discussion
Other tools that address the conditions in developing countries include SBAT [19] and EDGE [20]. Sustainable Building Assessment Tool (SBAT) supports the integration of sustainability into buildings and construction processes particularly in developing country contexts. It has a strong social component. Excellence in Design for Greater Efficiencies (EDGE) by International Finance Corporation (IFC) is an online platform aiming at 20 percent less energy use, 20 percent less water use, and 20 percent less embodied energy in materials compared to a base case building.

*Figure 5. Environmental, economic and social criteria in SBAT [19]*

SBAT can be used to set targets for sustainability performance. It can also be used to assess and improve performance as well as providing confirmation of the performance where this is required. The tool is based on a holistic approach to addressing sustainability and includes social, economic and environmental criteria. The selection and development of criteria aligns with the definition of sustainability developed by the World Wildlife Fund (WWF). This defines sustainability as the achievement of a maximum Ecological Footprint (EF) and a minimum Human Development Index (HDI). The SBAT measures performance of buildings and construction processes in terms of the extent to which they support environmental, economic and social sustainability and ultimately the achievement of EF and HDI minimum standards.

EDGE provides an online platform and a certification system for more than 160 countries. The application helps to determine the most cost-effective options for designing green within a local climate
context. It can be used for buildings of all vintages, including new construction, existing buildings and major retrofits. The value of the certification is a promotional advantage, as customers benefit from lower utility bills. EDGE is part of a holistic strategy to steer construction in rapidly urbanizing economies onto a more low-carbon path. It’s an example of IFC’s commitment to creating markets that are competitive, sustainable, inclusive and resilient [22].

Figure 6. An example of predicted savings of EDGE certification in Vietnam. [21]

6. Conclusion
All sustainability tools are developed from a chosen viewpoint. EDGE provides technical support to improve the performance in three environmental criteria at least 20% compared to local baseline. SBAT offers 15 assessment criteria containing aspects such as local economy, health, inclusion and social cohesion. SBC tools have been developed considering the work already done. The work in replicating and scaling up the use of SHERPA and MaS-SHIP tools continues.

The SBC programme continues sharing good policies, tools and technologies to support mainstreaming sustainable buildings and construction practices. A focus on emerging economies and markets supports in setting up programmes where the most ‘bang for buck’ may be achieved. SBC aims at implementing its signature products in partner countries to achieve impacts that can be measured before the programme will be concluded in 2022. It is still possible to join the programme to accelerate making the change.

References
[1] UN 2019 One Planet Network https://www.unenvironment.org/explore-topics/resource-efficiency/what-we-do/one-planet-network [9.1.2020]
[2] UN 2016 Sustainable Development Goal 12 Ensure sustainable consumption and production patterns https://sustainabledevelopment.un.org/sdg12 [9.1.2020]
[3] UNFCCC 2015 Paris Agreement https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement [9.1.2020]
[4] UN 2017 New Urban Agenda, 54 p. http://habitat3.org/wp-content/uploads/NUA-English.pdf [9.1.2020]
[5] One Planet Network 2019 Sustainable Buildings and Construction https://www.oneplanetnetwork.org/sustainable-buildings-and-construction [9.1.2020]
[6] Hakaste H and Huovila P 2019 Mainstreaming Affordable Sustainable Housing Practices in Developing Countries, SBE19 Helsinki Conference, 22-24 May 2019 https://sbe2019.exordo.com/programme/presentation/91 [9.1.2020]

[7] Penagos G, Isaza J, Lopera V and Jaramillo J 2018 Implementation of the Policy for Sustainable Construction in Valle de Aburrá. Area Metropolitana del Valle de Aburrá and Camacol Antioquia, 75 p.

[8] Gupta R, Seth S, Salcedo J, Tuteja S, Behal M, Caleb P and Banerjee A 2018 Mainstreaming Sustainable Social Housing in India: findings and insights from the MaS-SHIP project, Oxford Brookes University, TERI, Development Alternatives and UN-Habitat, New Delhi, December 2018. 92 p.

[9] One Planet Network 2017 SBC Trust Fund Project: Development of Sustainable Housing Design Tool “SHERPA” https://www.oneplanetnetwork.org/initiative/sbc-trust-fund-project-development-sustainable-housing-design-tool-sherpa [9.1.2020]

[10] Antuña C, Reda F and El-Mahgary Y 2019 Smart and sustainable urban development in Egypt: the case of Nabta Smart Town. IOP Conf. Ser.: Earth Environ. Sci. 297 012002 https://iopscience.iop.org/article/10.1088/1755-1315/297/1/012002/pdf [9.1.2020]

[11] One Planet Network 2019 Concrete Sustainability Council, Responsible sourcing system for concrete. https://www.oneplanetnetwork.org/initiative/concrete-sustainability-council-responsible-sourcing-system-concrete [9.1.2020]

[12] One Planet Network 2018 One Plan for One Planet. https://www.oneplanetnetwork.org/resource/one-plan-one-planet [9.1.2020]

[13] UN-Habitat 2017 Building Sustainability Assessment and Benchmarking. An Introduction. 67 p. https://unhabitat.org/sites/default/files/download-manager-files/Building%20Sustainability%20Assessment%20and%20Benchmarking.pdf

[14] UNEP 2018 Guidance Document on Procurement Sustainable Buildings and Construction. 59 p. https://www.oneplanetnetwork.org/resource/guidance-document-procuring-sustainable-buildings-and-construction [9.1.2020]

[15] UN-Habitat 2018 SHERPA for Sustainable Housing Projects. https://www.youtube.com/watch?v=DvqMBL5ymX0 [9.1.2020]

[16] One Planet Network 2017 SBC Trust Fund Project MaS-SHIP: Mainstreaming sustainable social housing in India. https://www.oneplanetnetwork.org/initiative/sbc-trust-fund-project-mas-ship-mainstreaming-sustainable-social-housing-india [9.1.2020]

[17] Antuña C 2017 SHERPA – A tool for sustainable housing design in the Global South. Presentation in InnoFrugal Conference 2017, April 24-25, Helsinki

[18] MaS-SHIP 2018 Case Studies. https://www.mainstreamingsustainablehousing.org/case-studies [9.1.2020]

[19] SBAT 2015 Sustainable Building Assessment Tool. http://www.sustainablebuildingassessmenttool.com/ [9.1.2020]

[20] Kapoor P, Saberi O and Oliver N 2019 Green Urban Development: A methodology to calculate site and infrastructure related GHG emissions. IOP Conf. Ser.: Earth Environ. Sci. 297 012004 https://iopscience.iop.org/article/10.1088/1755-1315/297/1/012004/pdf [9.1.2020]

[21] IFC 2020 EDGE Projects. https://www.edgebuildings.com/projects/song-duong-river-surface-water-treatment-plant/ [11.3.2020]

[22] IFC 2019 EDGE Green Buildings Market Transformation Program. https://www.oneplanetnetwork.org/initiative/edge-green-buildings-market-transformation-program-0 [9.1.2020]