Opportunities for Sustainable Consumption and Production integration into the National School Curriculum in Bhutan

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Foreword

This report is the result of an assignment for the Government of Bhutan as part of the advisory work of the EU SWITCH-Asia SCP Facility.

The European Commission established the SWITCH-Asia SCP Facility in 2017 in Bangkok, Thailand, to better facilitate coordination and implementation of its work on Sustainable Consumption and Production and to function as a backbone for the SWITCH-Asia Programme. It thus providing a single platform for all SWITCH-Asia projects. It enables the maximisation of project results, further promotes SCP policies and principles, and supports the delivery of SDGs.

The Kingdom of Bhutan is strongly committed to sustainable development. Bhutan has for decades been guided by the concept of Gross National Happiness (GNH), which seeks to integrate socio-economic development goals with environmental protection and cultural preservation as well as good governance.

A lower-middle-income country, Bhutan has reduced its extreme poverty rate by two-thirds in the last decade to 12 %. This fast-paced development is linked to growing energy consumption and economic activity including in the construction and tourism sectors as well as in mining and manufacturing. Growing affluence and urbanisation have led to increased consumption and vehicular traffic, and growing amounts of sewage and waste.

Education is one of the priority sectors in Bhutan for integrating and mainstreaming sustainable development and SCP. Anchoring SCP-related knowledge and skills into the education curriculum of tomorrow's active citizens and work force will enable a broad mainstreaming of SCP practices within the society and economy, including in various economic sectors and areas of production.

As part of the assignment, the SWITCH-Asia SCP Facility seeks to support a further mainstreaming of SCP issues into the education sector – focusing on school education – so that it becomes part of its curriculum as a cross-cutting topic, and is embedded within its policies and activities. The assignment builds capacities on SCP issues integration and competence-based, transformative pedagogy in this context. This could be the basis for broader institutional change, where education and learning further enable a society-wide transformation towards sustainability.

A comprehensive understanding of SCP education further facilitates policy processes with relevance for SCP, including in the agriculture and forestry, energy, and tourism sectors. In terms of skills and competencies built, it can be important for Bhutan's goal of self-sufficiency, and it is also relevant to the economy and labour market of Bhutan. Students will be able to use their SCP understanding and skills when they are a part of the workforce, shaping various economic sectors and strengthening the direction of sectoral development towards SCP. Students are also important contributors to broadening the understanding of their families on environment and sustainability. A broader societal understanding of the concept of SCP and its relevance also supports the government's commitment to SCP and sustainable development.

With this report, the SCP Facility seeks to contribute to the important process of mainstreaming SCP and making it an integral part of Bhutan's education approach, school curriculum, schools and students' learning.

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1.
Sustainable Consumption and Production
The role of SCP in implementing Agenda 2030 for Sustainable Development

This report[1] seeks to clarify which approaches are suitable for implementing a systemic perspective for offering options on how to promote SCP education as a core component of education for sustainable development and global citizenship education in Bhutan's National School Curriculum.

It first sketches the role of SCP in implementing the Agenda 2030 for Sustainable Development (SD). In the second chapter, it defines quality criteria in reorienting school education towards SD, and then derives opportunities for SCP integration in the National School Curriculum in Bhutan.

This study used the following methods.

a) Desk research to review national policy and legal frameworks including the following categories of documents:

- policy context (Constitution, general strategic documents, governmental program, etc.);
- strategic documents of the education sector, and other sectoral strategies;
- regulatory frameworks, for example, Curriculum Frameworks for subjects within the National School Curriculum;
- official reports and analyses, particularly national review reports on the implementation of the 2030 Agenda for sustainable development.

b) Consultations with stakeholders (a short survey, individual interviews and focus groups).

Emphasising the leading role of international organisations in transforming education towards sustainable development, strategic documents by UNESCO and OECD were used as reference points when appropriate.

1.1. SCP through the lens of global Sustainable Development Goals

Consumption and production are the core of socio-economic activities that impact the environment both locally and globally. Due to their complexity, production and consumption patterns have been in focus in sustainable development strategies since the Rio Earth Summit in 1992, when the world's Heads of States adopted the United Nations Agenda 21[2], a global programme of action.

A 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns[3] (10YFP) was adopted at the United Nations Conference on Sustainable Development, or Rio+20, in 2012. The 10YFP is to accelerate the shift towards sustainable consumption and production (SCP) at the regional and national level in order to promote social and economic development within the carrying capacity of ecosystems. 10YFP highlights both the complexity of and interlinkages among sustainability issues. 10YFP Programmes[4] include six documents: 1) Sustainable Tourism; 2) Sustainable Buildings and Construction; 3) Sustainable Lifestyles and Education; 4) Consumer Information for SCP; 5) Sustainable Public Procurement; and 6) Sustainable Food Systems.

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1   This Report is based on an analysis of the National School Curriculum, first edition, 2022 (Department of Curriculum and Professional Development, Ministry of Education, Royal Government of Bhutan). https://rec.gov.bt/curriculum-frameworks/

2   United Nations. Agenda 21: Programme of Action for Sustainable Development. New York, NY, USA, 1992. https://sustainabledevelopment.un.org/outcomedocuments/agenda21

3   United Nations. A 10-year framework of programmes on sustainable consumption and production patterns, 19 June 2012, A/CONF.216/5, annex. https://www.oneplanetnetwork.org/sites/default/files/10yfp-a-conf.216-5-en.pdf

4   UNEP. 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns. https://www.unep.org/explore-topics/resource-efficiency/what-we-do/one-planet-network/10yfp-10-year-framework-programmes

SCP can be characterised by two broad and interrelated objectives: 1) achievement of well-being for all people, and 2) protection and more efficient use of natural resources, including longer life span of products and greater reliance on recovered or secondary materials. Environmental, economic and social dimensions of production patterns are directly linked to the consumption patterns in the markets and cultures they serve. "Sustainable consumption" does not automatically translate to "less consumption" but rather to more efficient, better informed and less resource-intensive consumption. This is especially important for people living in poverty, often having a reasonable need to increase their consumption of products and services.

Key principles of SCP

1. *Improving the quality of life without increasing environmental degradation and without compromising the resource needs of future generations.*

2. *Decoupling economic growth from environmental degradation by:*

   - *Reducing material/energy intensity of current economic activities and reducing emissions and waste from extraction, production, consumption and disposal.*

   - *Promoting a shift of consumption patterns towards groups of goods and services with lower energy and material intensity without compromising quality of life.*

3. *Applying life-cycle thinking which considers the impacts from all life-cycle stages of the production and consumption process.*

4. *Guarding against the re-bound effect, where efficiency gains are cancelled out by resulting increases in consumption.*

Source: **Sustainable Consumption and Production. A Handbook for Policymakers. Global edition**[5], p.10

The 2030 Agenda for Sustainable Development[6], adopted in 2015 by all United Nations Member States, provides 17 Sustainable Development Goals (SDGs) as a comprehensive global policy framework. SDGs are accompanied by a set of 169 targets, that is, specific, measurable objectives. Targets are defined as aspirational and global, with each Government setting its own national targets guided by the global level of ambition but taking into account national circumstances. Global-level monitoring relies on a limited and carefully selected group of leading indicators to provide an overview of progress towards each target[7].

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55. The Sustainable Development Goals and targets are integrated and indivisible, global in nature and universally applicable, taking into account different national realities, capacities and levels of development and respecting national policies and priorities.

Source: **The 2030 Agenda for Sustainable Development**

A separate goal is dedicated to SCP, namely, **SDG 12: Ensure sustainable consumption and production patterns**. SDG 12, including corresponding targets, is crucial for achieving other SDGs because of its environmental and social impact. It could fall under goals such as no poverty and hunger, healthy lives and well-being, clean water, biodiversity protection, food and energy security, industry, innovation and infrastructure, climate change, good jobs and economic growth (Table 1 presents connections of the SDG 12 targets with other SDGs).

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5   UNEP. 2015. *Sustainable Consumption and Production. A Handbook for Policymakers*. Global edition. United Nations Environment Programme. https://sustainabledevelopment.un.org/content/documents/1951Sustainable%20Consumption.pdf
6   UN. 2015. *Transforming our World: The 2030 Agenda for Sustainable Development*. United Nations, 21 October 2015. A/RES/70/1. https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E
7   UN. Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development. https://unstats.un.org/sdgs/indicators/indicators-list/

Table 1
Connections of the SDG 12 targets with other SDGs

	SDG 12 targets	Related SDGs
12.1	Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries	SDG 17
12.2	By 2030, achieve sustainable management and efficient use of natural resources	SDG 6, SDG 7, SDG 14, SDG 15, SDG 17
12.3	By 2030, halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains including post-harvest losses	SDG 2
12.4	By 2020, achieve environmentally sound management of chemicals and all wastes throughout their life cycle, ... reduce their release to air, water and soil to minimise their adverse impacts on human health and the environment	SDG 3, SDG 6, SDG 9, SDG 13
12.5	By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	SDG 8 SDG 11
12.6	Encourage companies ... to adopt sustainable practices and to integrate sustainability information into their reporting cycle	SDG 9, SDG 16
12.7	Promote public procurement practices that are sustainable in accordance with national policies and priorities	SDG 1, SDG 3, SDG 6, SDG 7, SDG 11, SDG 13
12.8	By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature	SDG 4, SDG 5, SDG 9, SDG 13

A special target, SDG 12.1, is dedicated to the 10YFP. The extension of the mandate of the 10-Year Framework highlights the importance of SCP with regard to achieving the overall 2030 Agenda.

> *9. Sustainable consumption and production offers systemic solutions to transform the way societies produce and consume goods and services while also positively contributing to poverty alleviation, climate change mitigation and adaptation, ecosystem protection and restoration, and the elimination of waste and pollution.*
>
> Source: **Progress report on the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns**[8]
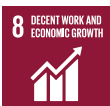
Unpacking SDG 12 reveals a broad range of SCP issues that touch upon almost all SDGs (see Tables 2 and 2-1). Therefore, SCP could be considered as a core of SD because of its complexity which demonstrates mutual interdependence of economic, environmental and social-cultural factors as well as personal

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8   UN. 2022. Progress report on the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns. United Nations, E/2022/56. https://www.oneplanetnetwork.org/sites/default/files/from-crm/Progress%2520report%2520of%2520the%252010-year%2520framework%2520of%2520programmes_0.pdf

lifestyles. Table 1 shows a selection of SDGs according to the SDG12 targets. These links will need to be accounted for in implementation and monitoring in order to have a successful outcome. To be more specific, an identification of targets attributed to other SDGs and relevant indicators is needed. Therefore, a selected SDG 12 target/ SCP issue will be reflected in a number of targets attributed to other SDGs. Understanding how the SDGs are interlinked will support better policies and more effective action to attain sustainable development targets.

Table 2
SCP issues in the context of SDGs

SDG12	Relevant SDGs and targets			SCP issues
12.1	Implementing **10YFP Programmes**, particularly in developing countries		17.16	Global and multi-stakeholder partnerships for sustainable development
12.2		**SDG 6:** Clean Water and Sanitation	6.4/ 6.5/ 6.b	Efficient use of water resources
		SDG 7: Affordable and Clean Energy	7.2/ 7.3	Energy efficiency and renewable energy
		SDG 14: Life Below Water	14.1/ 14.2	Sustainable management of ecosystems/ biodiversity/ land
		SDG 15: Life on Land	15.1/ 15.4/ 15.9	
		SDG 17: Partnership for the Goals	17.14/ 17.17	Good governance
12.3		**SDG 2:** Zero Hunger	2.4/ 2.c	Food production and supply patterns
12.4		**SDG 3:** Good Health and Well-being	3.9	Reducing death and illness from pollution
		SDG 6: Clean Water and Sanitation	6.3	Improving water quality by reducing pollution
		SDG 13: Climate Action	13.1	Resilience to climate-related hazards
12.5		**SDG 8:** Decent Work and Economic Growth	8.4	Efficient use of resources (decoupling)
		SDG 11: Sustainable Cities and Communities	11.6	Waste management

12.6		SDG 9: Industry, Innovation and Infrastructure	9.4/ 9.b	Promoting sustainable practices
		SDG 16: Peace, Justice and Strong Institutions	16.6	Accountability of institutions
12.7		SDG 1: No Poverty	1.3	Assurance of sustainable living standards, housing and transportation
		SDG 3: Good Health and Well-being	3.8	
		SDG 6: Clean Water and Sanitation	6.1/ 6.2	
		SDG 7: Affordable and Clean Energy	7.1	
		SDG 11: Sustainable Cities and Communities	11.2/ 11.7	
		SDG 13: Climate Action	13.2	Mainstreaming climate change mitigation measures
12.8		SDG 4: Quality Education	4.7	Accessible education, training and raising public awareness on sustainability
		SDG 5: Gender Equality	5.b	Equal opportunities (in particular to ICT)
		SDG 9: Industry, Innovation and Infrastructure	9.c	Access to internet resources
		SDG 13: Climate Action	13.3	Education, training and raising public awareness on climate change
		SDG 16: Peace, Justice and Strong Institutions	16.7/ 16.10	Transparency, access to information and decision-making

SDG 12	SDGs/ targets	Quotations
12.1	17.16	Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries.
12.2	6.4	By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.
	6.5	By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.
	6.b	Support and strengthen the participation of local communities in improving water and sanitation management.
	7.2	By 2030, increase substantially the share of renewable energy in the global energy mix.
	7.3	By 2030, double the global rate of improvement in energy efficiency.
	14.1	By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution
	14.2	By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.
	15.1	By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.
	15.4	By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.
	15.9	By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.
	17.14	Enhance policy coherence for sustainable development.
	17.17	Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships.
12.3	2.4	By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.
	2.c	Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.

12.4	**3.9**	By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.
	6.3	By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.
	13.1	Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.
12.5	**8.4**	Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead.
	11.6	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.
12.6	**9.4**	By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.
	9.b	Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities.
	16.6	Develop effective, accountable and transparent institutions at all levels.
12.7	**1.3**	Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable.
	3.8	Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.
	6.1	By 2030, achieve universal and equitable access to safe and affordable drinking water for all.
	6.2	By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.
	7.1	By 2030, ensure universal access to affordable, reliable and modern energy services.
	11.2	By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.
	11.7	By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.
	13.2	Integrate climate change measures into national policies, strategies and planning.

12.8	4.7	By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.
	13.3	Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
	9.4	By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.
	9.c	Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.
	16.7	Ensure responsive, inclusive, participatory and representative decision-making at all levels.
	16.10	Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements.

1.2. Key enablers for promoting SCP education at the systemic level

In implementing any innovation, appropriate capacities as purposeful enablers are of critical importance. At the individual level, capacity building refers to the process of changing people's attitudes as well as societal and professional behaviours, most frequently through education and training. Capacity building at the institutional level focuses on overall organisational performance and functioning capabilities, as well as the ability of organisation to adapt to change. At the systemic level capacity building is concerned with the creation of "enabling environments", that is, the overall policy and regulatory frameworks within which institutions and individuals operate.

In this regard, a National School Curriculum, as a regulatory framework, should be attributed to the category of systemic enablers. At the same time, such a Curriculum represents the main characteristics of the national education policy. It should be noted that SCP themes (or SDGs, in a broader scope) are not originally a part of the education sector, but rather are real-life issues that need to be integrated. It is therefore important to consider approaches that can facilitate achieving meaningful and long-term change.

An inadequate emphasis to address problems at the systemic level may, for example, diminish the impact of efforts at the institutional (e.g., school) and individual (e.g., student, teacher) levels. Therefore, stocktaking at the systemic level is suggested as a starting point.

Besides, The European Green Deal is an integral part of the EU strategy for implementing the United Nation's 2030 Agenda and the SDGs. It is "a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use. It also aims to protect, conserve and enhance the EU's natural capital, and protect the health and well-being of citizens from environment-related risks and impacts. … Schools, training institutions and universities are well placed to engage with pupils, parents, and the wider community on the changes needed for a successful transition."[9]

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9   European Commission. 2019. *The European Green Deal*. Brussels, 11.12.2019 COM(2019) 640 final.
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2019%3A640%3AFIN

2.
Quality Education

Quality criteria in reorienting school education towards sustainable development

2.1. Selection of indicators for SCP integration in the National School Curriculum

The United Nations Agenda 21 (1992) emphasises the critical role of education in achieving sustainable development. It is important for achieving values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making. Reorienting education towards sustainable development was recognised as a common goal to be implemented globally, nationally and locally.

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has been the lead United Nations agency since the Decade of Education for Sustainable Development in 2005-2014 began. The overall goal of the Decade was to integrate the principles, values and practices of sustainable development into all aspects of education and learning.

Education for Sustainable Development (ESD) empowers learners with knowledge, skills, values and attitudes to take informed decisions and make responsible actions for environmental integrity, economic viability and a just society.

ESD is a lifelong learning process and an integral part of quality education. It enhances the cognitive, social and emotional and behavioural dimensions of learning. It is holistic and transformational, and encompasses learning content and outcomes, pedagogy and the learning environment itself.

ESD is recognized as a key enabler of all Sustainable Development Goals and achieves its purpose by transforming society. ESD empowers people of all genders, ages, present and future generations, while respecting cultural diversity.

Source: **UNESCO**, https://en.unesco.org/themes/education-sustainable-development/what-is-esd

Recognising the importance of education, the 2030 Agenda for Sustainable Development highlights education as a stand-alone goal (SDG 4) which is essential for the success of all SDGs. Incheon Declaration[10], adopted at the World Education Forum (May 2015, Incheon, Republic of Korea), constitutes the commitment of the education community to the proposed Goal 4: "**Ensure inclusive and equitable quality education and promote life-long learning opportunities for all**" and its corresponding targets. Educational targets also are included in several other SDGs, particularly in SDG 12 on SCP.

A role of education in relation to SCP is defined by the target SDG 12.8: "By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature".

The target SDG 12.8 is compatible with the overarching target SDG 4.7, which indicates the main characteristics of education that lead to knowledge-based transformation towards sustainability:

"4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development

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10   UNESCO. 2015. Incheon Declaration: Education 2030: Towards Inclusive and Equitable Quality Education and Lifelong Learning for All. ED/WEF2015/MD/3. https://unesdoc.unesco.org/ark:/48223/pf0000233137

and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development".

SDG 4.7 refers to the transformative competences and, at the same time, provides an unprecedented opportunity to mainstream education for sustainable development into school education. This target covers both education for sustainable development (ESD) and a complementary global citizenship education (GCED)[11] as these concepts overlap and aim to equip learners with the transversal higher order competences including:

- **cognitive –** learner's ability to think critically, systemically and creatively, including adopting a multi-perspective approach;
- **non-cognitive –** communicating and interacting with people of different backgrounds, origins, cultures and perspectives, empathy and conflict resolution;
- **behavioural –** ability to act collaboratively and responsibly, and to strive for individual, collective, and global good.

It is critical that learners should be able to intelligently make connections across elements of a competence, integrate and interactively apply them to respond to contextual demands as well as to change their contexts. An integrity and values orientation is particularly reflected in the definition of a competence provided by UNESCO[12]: "Competence is herein defined as the developmental capacity to interactively mobilize and ethically use information, data, knowledge, skills, values, attitudes, and technology to engage effectively and act across diverse 21st century contexts to attain individual, collective, and global good" (UNESCO, 2017a, p. 27).

Growing complexity, interconnectedness, rapid change as well as uncertainty and risks are characteristic of different spheres of life. The OECD position paper, The Future of Education and Skills[13], also highlights the complex evolving circumstances and interdisciplinarity: "Disciplinary knowledge will continue to be important, as the raw material from which new knowledge is developed, together with the capacity to think across the boundaries of disciplines and 'connect the dots'" (OECD, 2018, p. 5). It implies a shift from domain-specific competences towards general/transversal competences, relevant to all domains or subjects.

The above-mentioned transversal competences (or key competences, or 21st century competences) are essential for societal transformation, therefore these are called "transformative competences" (see, for example, the recent strategic documents by UNESCO[14] and OECD[15]). Actually, different dimensions of learning, which are reflected in different competence frameworks, found their roots in the 'four pillars' presented in the Delors Report[16] (UNESCO, 1997), namely, Learning to learn (cognitive); Learning to live together and Learning to be (non-cognitive); and Learning to do (behavioural).

Interplay of different SDGs and targets brings new features also to the target SDG 12.8 on SCP education ("By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature"). Table 3 presents a summary of relevant SDGs, their selected targets and corresponding indicators for human capacity development.

11   "Global Citizenship Education (GCED): nurtures respect for all, building a sense of belonging to a common humanity and helping learners become responsible and active global citizens. GCED aims to empower learners to assume active roles to face and resolve global challenges and to become proactive contributors to a more peaceful, tolerant, and inclusive and secure world". UNESCO. 2019. SDG indicator 4.7.1: Proposal for a Measurement Strategy, p. 4. https://gaml.uis.unesco.org/wp-content/uploads/sites/2/2019/08/GAML6-REF-9-measurement-strategy-for-4.7.1-4.7.4-4.7.5.pdf
12   UNESCO. 2017a. Future Competences and the Future of Curriculum. A Global Reference for Curricula Transformation. UNESCO, International Bureau of Education.
http://www.ibe.unesco.org/en/news/future-competences-and-future-curriculum-global-reference-curriculum-transformation
13   OECD. 2018. The Future of Education and Skills: Education 2030.
https://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf
14   UNESCO. 2020. Education for Sustainable Development: A Roadmap. ESD for 2030. https://www.gcedclearinghouse.org/sites/default/files/resources/200782eng.pdf
15   OECD. 2019. OECD Future of Education and Skills. Education 2030. Transformative Competencies for 2030.
  https://www.oecd.org/education/2030-project/teaching-and-learning/learning/transformative-competencies/Transformative_Competencies_for_2030_concept_note.pdf
16   UNESCO. 1996. Learning: The treasure within. https://unesdoc.unesco.org/ark:/48223/pf0000102734

Table 3
Targets and indicators for education quality according to relevant SDGs

SDGs	Targets	Indicators
SDG 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development	4.7.1 Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment
SDG 12 Ensure sustainable consumption and production patterns	12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature	12.8.1 Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment
SDG 13 Take urgent action to combat climate change and its impacts.	13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	13.3.1 Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment
Additional enablers		
SDG 5 Achieve gender equality and empower all women and girls	5.b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women	5.b.1 Proportion of individuals who own a mobile telephone, by sex
SDG 9 Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation	9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending	9.5.1 Research and development expenditure as a proportion of GDP 9.5.2 Researchers (in full-time equivalent) per million inhabitants
	9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020	9.c.1 Proportion of population covered by a mobile network, by technology

SCP issues usually are discussed in a rational economic / technological perspective and do not address how cultural identity, values and attitudes may have an impact on existing patterns. Differently, referring to target SDG 4.7, the importance of social and cultural contexts of education are highlighted.

SCP is indispensable for SDG 13 on combating climate change, therefore SCP capacity development is supported by the corresponding educational target: "13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning".

Continuous updating of knowledge should be based on research and turned into action by innovation. Therefore, implementation of the SDG 12.8 also is facilitated by SDG 9, including targets 9.5 and 9.c, with a special emphasis on gender equality in using information and communications technology according to the target SDG 5.3.

2.2. Operationalisation of the quality criteria for sustainability competence development

Education for sustainable development is recognised as an essential element of quality education and, at the same time, a key to co-creation of more just, peaceful and sustainable communities by implementing global Sustainable Development Goals.

Quality criteria[17] which reflect the main principles or standards of the educational paradigm provide a compass for intended transformations. For three interrelated targets on education (4.7, 12.8 and 13.3) the same qualitative indicator is provided by the Global Indicator Framework[18]: "Extent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in: (a) national education policies, (b) curricula, (c) teacher education and (d) student assessment". Table 4 presents the essential components of 4.7.1 indicator[19] with an emphasis on coherence in reorienting of key activities towards sustainability.

Table 4
Quality criteria for competence development
Source: http://uis.unesco.org/en/glossary

Definition	Operationalisation
Education policies	
Decisions made by government or education authorities that have a direct or significant effect on the curriculum, its development and implementation. These decisions are normally recorded in a range of official documents.	The mainstreaming of GCED and ESD (*SCP education*) in legal frameworks at national and sub-national levels at each level of education (e.g., pre-primary, primary, secondary, tertiary, non-formal education).
Curriculum	
Design, planning and sequencing of teaching and learning processes. It includes a statement of purpose, contents, activities and learning practices, as well as the modalities for assessing learners' achievements.	The mainstreaming of GCED and ESD (*SCP education*) in curricula at each level of education including: coverage of the topics in mandatory subjects and extracurricular activities; time for learning (e.g., number of teaching hours for these topics); and teaching and resource material.

17   Criterion is a principle or standard by which something may be judged or decided.
18   UN. Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development. https://unstats.un.org/sdgs/indicators/indicators-list/
19   UNESCO. 2019. SDG indicator 4.7.1: Proposal for a Measurement Strategy. https://gaml.uis.unesco.org/wp-content/uploads/sites/2/2019/08/GAML6-REF-9-measurement-strategy-for-4.7.1-4.7.4-4.7.5.pdf

Teacher education

Formal teacher training (pre-service or in-service) designed to equip teachers with the knowledge, attitude, behaviour and skills required for teaching at the relevant level.	The mainstreaming of GCED and ESD (*SCP education*) in initial and continuing professional development of teachers at each level of education.

Student assessment

The process through which the progress and achievements of a learner or learners is measured or judged in compliance with specific quality criteria.	The mainstreaming of GCED and ESD (*SCP education*) in student assessments and examinations addressing student knowledge and skills, values, attitudes and behaviours, at each level of education.

This input-type indicator requires analysis of relevant information at the systemic level to ensure that political will and resources are translated into concrete policies, curricula and assessment. The focus is on policy development and implementation rather than student learning outcomes; the indicator does not show directly whether national measures lead to desired changes in learning outcomes and does not assess learning outcomes. However, education policies, curricula, teacher education and student assessment are key preconditions and intermediate results in implementing transformative education and providing a conducive learning environment[20].

Policy is a key factor for initiating systemic change. The Ministries of Education have an important responsibility to ensure that education systems are prepared for, and responsive to, existing and emerging sustainability challenges. Relevant and coherent policies designed by the ministries in cooperation with different stakeholders are crucial.

To be efficient, education for sustainability should reflect principles of sustainable development itself. While there could be various interpretations of sustainability principles depending on a specific implementation area, four principles are fundamental[21]:

- the normativity principle;
- the equity principle;
- the integration principle;
- the dynamism principle.

These principles should be embedded not only at the systemic level (in the policy documents), but also bring important aspects to all learning dimensions as well as to corresponding domains of learning outcomes. To become a real change agent for sustainability, education should be based on values and principles of sustainable development.

Curriculum is the main driver of teacher's training and assessment and, therefore, a focus in evaluation of education quality. Learners' competences represent an ultimate goal and a core of the competence-based curriculum. Table 5 presents key competences for sustainability that are based on an integrated and humanistic approach to education.

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20 UNESCO. 2018. Quick Guide to Education Indicators for SDG 4. UNESCO Institute for Statistics. https://bangkok.unesco.org/content/quick-guide-education-indicators-sdg-4
21 Waas,T., Hugé, J., Verbruggen, A. and Wright, T. 2011. Sustainable Development: A bird's eye view. *Sustainability*, 3, 1637-1661. https://www.mdpi.com/2071-1050/3/10/1637

Table 5	
Key competences for sustainability	
Source: UNESCO, 2017. Education for Sustainable Development Goals: Learning Objectives. https://unesdoc.unesco.org/ark:/48223/pf0000247444	
Systems thinking competence	The ability to recognise and understand relationships; to analyse complex systems; to think of how systems are embedded within different domains and different scales; and to deal with uncertainty.
Anticipatory competence (Futures thinking)	The ability to understand and evaluate multiple futures – possible, probable and desirable; to create one's own visions for the future; to apply the precautionary principle; to assess the consequences of actions; and to deal with risks and changes.
Critical thinking competence	The ability to question norms, practices and opinions; to reflect on one's own values, perceptions and actions; and to take a position in the sustainability discourse.
Self-awareness competence	The ability to reflect on one's own role in the local community and (global) society; to continually evaluate and further motivate one's actions; and to deal with one's feelings and desires.
Normative competence	The ability to understand and reflect on the norms and values that underlie one's actions; and to negotiate sustainability values, principles, goals, and targets, in a context of conflicts of interest and trade-offs, uncertain knowledge and contradictions.
Strategic competence	The ability to collectively develop and implement innovative actions that further sustainability at the local level and further afield.
Collaboration competency	The ability to learn from others; to understand and respect the needs, perspectives and actions of others (empathy); to understand, relate to and be sensitive to others (empathic leadership); to deal with conflicts in a group; and to facilitate collaborative and participatory problem solving.
Integrated problem-solving competence	The overarching ability to apply different problem-solving frameworks to complex sustainability problems and develop viable, inclusive and equitable solution options that promote sustainable development, integrating the above-mentioned competences.

The SDGs provide a useful starting point for staff and students interested in including sustainability content in the learning process. The breadth of the SDGs and the depth of the targets within each goal means that they can resonate with all academic disciplines and subject areas. Particularly SDG 12 on responsible consumption and production can influence learning outcomes of any discipline because of the broad spectrum of issues involved as well as its relevance to the life of every student. While individual Goals represent an entry point into disciplinary content, it is important that educators recognise the mutual interdependence and impacts of different SDGs (see Table 1 and Table 2).

Complex issues of sustainable development can hardly be explored within the limits of a single academic discipline. Complexity calls for an integrated or cross-curricular approach, that is, an approach to formulating curriculum that favours the dynamic use of learning topics and themes to be covered and skills/competencies to be developed in a number of learning areas across the curriculum[22]. In a transdisciplinary approach the focus is on an authentic, real-world issue rather than on the disciplinary theme. Learning content and learning outcomes have an influence on teaching methods, learning environments and assessment practices.

22   UNESCO. Glossary of Curriculum Terminology. International Bureau for Education. http://www.ibe.unesco.org/en/glossary-curriculum-terminology

Teacher education, including continuous professional development, is an essential precondition in preparing teachers to guide, empower and motivate learners to transform themselves and society. Therefore, in addition to sustainability competences, teachers need an appropriate capacity for implementing action-oriented pedagogical practices as well as their general knowledge about sustainable development[23]. Learning on the basis of real societal challenges in local contexts requires cooperation with external partners (e.g., private sector, local communities, academics and civil society).

"To encourage learners to become change agents who have the knowledge, means, willingness and courage to take transformative action for sustainable development, learning institutions need, themselves, to be transformed"[24]. A whole school approach means that all aspects of an institution's internal operations and external relationships are reviewed and revised in the light of sustainable development principles. It involves rethinking the curriculum, campus operations, organisational culture, student participation, leadership and management, community relationships and research. Learning experiences at the school provide a model of civil society and serve as leadership and citizenship training.

The United Nations Economic Commission for Europe (UNECE) framework of competences for educators[25] (not only for teachers) serves as a guideline to facilitate the education for sustainability within different educational settings. A range of core competences is presented explicitly in a systematic and comprehensive manner and clustered around three essential characteristics:

- a holistic approach, which seeks integrative thinking and practice;
- envisioning change, which explores alternative futures, learns from the past and inspires engagement in the present;
- achieving transformation, which serves to change the way people learn and in the systems that support learning.

It is suggested to adopt a whole school approach for the continuing professional development of educators in their workplace.

Student assessment is vital to the education process. Summative assessments (*assessment of learning*) are used to measure learners' outcomes at the end of a theme or unit. Ministries or departments of education may use summative assessments and evaluations as an instrument of quality assurance and accountability. Increasingly, international summative assessments – such as, Organisation for Economic Co-operation and Development's (OECD's) Programme for International Student Assessment (PISA) – have been important for comparing national education systems to developments in other countries.

Formative assessment (*assessment for learning*) is to support a student's individual progress towards intended learning outcomes and is based on teacher-learner collaboration. In classrooms, formative assessment refers to frequent interactive assessments of student progress, and understanding to identify learning needs and adjust teaching appropriately. Teachers using formative assessment approaches and techniques are better prepared to meet diverse students' needs – through differentiation and adaptation of teaching to raise levels of student achievement and to achieve a greater equity of student outcomes. Learners are made aware of their strengths and weaknesses while being provided with adequate support to overcome learning difficulties.

Assessment as learning occurs when students reflect on their progress to inform their future learning goals. It helps students to take more responsibility for their own learning and monitoring future directions. Through reflection, students are able to learn about themselves as learners and become aware of how they learn. It is particularly important for a personalised learning approach.

A variety of methods can be used for assessment *of*, *for* and *as learning*. The selection of a method depends on the purpose of the assessment in a specific context.

23   UNESCO. 2017. Education for Sustainable Development Goals: Learning objectives.
https://unesdoc.unesco.org/ark:/48223/pf0000247444_eng
24   UNESCO. 2020. *Education for Sustainable Development: A Roadmap.*
https://unesdoc.unesco.org/ark:/48223/pf0000374802.locale=en
25   UNECE. 2011. Learning for the Future. Competences in ESD for educators. ECE/CEP/AC.13/2011/6. http://www.unece.org/fileadmin/DAM/env/esd/ESD_Publications/Competences_Publication.pdf

3.
Curriculum Mapping
Defining opportunities for SCP integration in the National School Curriculum in Bhutan

National School Curriculum in Bhutan as well as curriculum policies and curricula worldwide are oriented to competences necessary for employability, personal fulfilment and health, active and responsible citizenship, and social inclusion. However, certain challenges currently in focus require both ethical and knowledge-based solutions, for example, climate crisis, health and food, energy, use of natural resources, ecosystem- and bio-diversity, democracy, equity and solidarity. Education aims to empower young people and stimulate their initiatives for individual and societal transformation as well as to contribute in implementing the SDGs. The development of transformative competences by learners is a prerequisite for action for sustainable development.

> *The curriculum is central to education and plays a vital role in achieving the purpose of education as defined under the policy goals. It secures the right of all children and young people to a holistic education.*
>
> Source: **National Education Policy** (Draft)[26], page 8

An overarching National School Curriculum Framework is to guide the selection of learning experiences, outcomes, standards and assessment for all learning areas. It also promotes the country's unique culture, traditions and values while students learn to participate actively in the process of building an educated, enlightened and cohesive society[27]. It is recognised that competency is more than just knowledge or skills, and involves the ability to meet complex demands by drawing on and mobilising psycho-social resources (including skills and attitudes) in a particular context.

The curriculum mapping exercise is based on the approaches and criteria described in the previous sections. Before directly analysing the National School Curriculum, the policy and cultural context as well as educational policy were reviewed. Currently, Bhutan's National School Curriculum (2022) is organised according to the following main components: Learning content ("Strands"), Learning outputs ("Competency Based Standards") and "Learning Objectives" that include detailed description of concepts and skills. These components were analysed by using internationally approved indicator SDG 4.7.1. A broad spectrum of SCP issues is based on the summary presented in the Table 1 and Table 2.

3.1. The policy and cultural context for sustainable development in Bhutan

The Constitution of the Kingdom of Bhutan consolidates the aim of sustainable development from one side and the ambition of Gross National Happiness (GNH) from another. The philosophy of GNH, since its inception in Bhutan in the early 1970s by His Majesty Jigme Singye Wangchuck, supports sustainable development by a holistic approach to equitable economic and social development as well as ecological sustainability[28]. However, GNH as a set of guiding principles for development, dates back to the unification

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26   National Education Policy (Draft). Royal Government of Bhutan, Thimphu, 2019. http://www.education.gov.bt/wp-content/uploads/2021/09/National-Education-Policy-2019-Draft.pdf
27   Gyeltshen, K. and Zangmo, S. 2020. School Education in Bhutan. In: Sarangapani, P. and Pappu, R. (eds) *Handbook of Education Systems in South Asia. Global Education Systems.* Springer, Singapore. https://doi.org/10.1007/978-981-13-3309-5_12-1
28   Ura, K., Alkire, S., Zangmo, T. and Wangdi, K. 2012. An Extensive Analysis of GNH Index. Centre for Bhutan Studies. https://ophi.org.uk/wp-content/uploads/Ura_et_al_Extensive_analysis_of_GNH_index_2012.pdf

of Bhutan in 1729 when the legal code by Zhabdrung Rinpoche declared: "if the Government cannot create happiness for its people, there is no purpose for the Government to exist".

> *Article 9: Principles of State Policy*
> *2. The State shall strive to promote those conditions that will enable the pursuit of Gross National Happiness.*
> *20. The State shall strive to create conditions that will enable the true and sustainable development of a good and compassionate society rooted in Buddhist ethos and universal human values.*
>
> *Article 3: Spiritual Heritage*
> *1. Buddhism is the spiritual heritage of Bhutan, which promotes the principles and values of peace, non-violence, compassion and tolerance.*
>
> *Article 4: Culture*
> *2. The State shall recognize culture as an evolving dynamic force and shall endeavour to strengthen and facilitate the continued evolution of traditional values and institutions that are sustainable as a progressive society.*
>
> *Article 5: Environment*
> *2. The Royal Government shall:*
> *(c) Secure ecologically balanced sustainable development while promoting justifiable economic and social development; and (d) Ensure a safe and healthy environment.*
>
> Source: **The Constitution of the Kingdom of Bhutan**[29]

The multi-dimensional concept of GNH covers four strategic areas as the ***four pillars*** of GNH:

1. Equitable socio-economic development;
2. Conservation of the environment;
3. Preservation and promotion of culture;
4. Promotion of good governance.

The last two pillars particularly emphasise the role of culture and governance, while in the context of sustainable development they are usually included in the generalised social dimension. Buddhist GNH philosophy calls for material and spiritual development that mutually reinforce one another, and thereby aims at harmony between 'inner skills' and 'outer circumstances'[30]. It is important to recognise in this context that SCP is not only a technical/ economic issue, but has deep roots in the social/cultural context of a society. SCP can also be considered as an opportunity for developing, or safeguarding, relevant and acceptable values in the society as well as for relying on them.

The four pillars of GNH were further specified by ***nine domains,*** which were selected on normative grounds:

- Living standards
- Education
- Health
- Environment
- Community vitality
- Time-use
- Psychological well-being
- Good governance
- Cultural resilience and promotion.

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29   The Constitution of the Kingdom of Bhutan. https://www.nab.gov.bt/dz/business/constitution_of_bhutan
30   van Norren, Dorine E. 2020.The Sustainable Development Goals viewed through Gross National Happiness, Ubuntu, and Buen Vivir. *International Environmental Agreements, 2020*, 20: 431–458. https://doi.org/10.1007/s10784-020-09487-3

Bhutan follows a five-year socio-economic development planning cycle by developing Five-Year Plans (FYP). The 12th FYP[31] covers the period up to 30 June 2023 and is framed on the nine domains which form the primary basis of measuring progress towards achieving GNH. Reflecting Bhutan's status as an active member of the global community, the 12th FYP also takes into consideration the SDGs and other regional and international commitments.

> *While the SDGs advocate the pursuit of development in its three dimensions—social, economic and environment—in a balanced and integrated manner, GNH encompasses those dimensions as well the additional dimension of culture. Within its broad framework of the four pillars, 16 of the 17 SDGs are well captured. The one Goal that stands as an exception is SDG 14, pertaining to oceans, seas and marine resources.*
>
> Source: **Gross National Happiness for the Global Goals**[32], page 24

Given the high levels of synergy between GNH and the SDGs, integration of the latter into the national development framework has been fairly seamless and continues to be fostered. Voluntary National Reviews (VNR) are part of the follow-up and review of the 2030 Agenda for Sustainable Development. As was noted in the first VNR Report, "With regard to localization of the SDGs, at the national level, there is a very high level of integration between the SDGs and our development philosophy of GNH". The second VNR Report[33] pointed out, "12th FYP was formulated with GNH and the SDGs as a guiding basis, and represents a major step in implementing the 2030 Agenda".

GNH recognises culture as central to identity, spiritual practices, society, economy and sustainability. It promotes a culture which is future oriented instead of merely traditional, as well as a founding value of human rights. GNH insists on including a notion of community vitality, right to a compassionate society and family bonds. GNH proponents claim that it embodies the SDGs but goes far beyond that[34].

The Bhutanese development policy of GNH, in line with the global understanding of sustainable development, provides an authentic cultural space to promote environmentally friendly societal happiness and well-being based on traditional values.

See a comprehensive situation analysis in Annex 1: **Analysis of the SCP status and trends in Bhutan in the context of sustainable development (SDGs)** by Dr Lam Dorji

3.2. Education policy in Bhutan

> *Article 9: Principles of State Policy*
> *15. The State shall endeavour to provide education for the purpose of improving and increasing knowledge, values and skills of the entire population with education being directed towards the full development of the human personality.*
>
> Source: **The Constitution of the Kingdom of Bhutan**

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31   GNHC. 2019. Twelfth Five Year Plan: 2018-2023. Gross National Happiness Commission, Royal Government of Bhutan, Thimpu.https://www.gnhc.gov.bt/en/wp-content/uploads/2019/05/TWELVE-FIVE-YEAR-WEB-VERSION.pdf
32   Royal Government of Bhutan and UNDP. 2017. Gross National Happiness for the Global Goals. Report of the 13th Round Table Meeting, 15-16 March 2017, Thimphu, Bhutan. https://rtm.gnhc.gov.bt/wp-content/uploads/2017/07/Final-RTM-Report_print_web.pdf
33   GNHC. 2021.Transformations for Sustainable Development in the 21st Century. Bhutan's Second Voluntary National Review Report on the Implementation of the 2030 Agenda for Sustainable Development, 2021. Royal Government of Bhutan, Thimpu. https://www.gnhc.gov.bt/en/wp-content/uploads/2021/09/2nd-VNR-Report-SDGs.pdf
34   Van Norren, Dorine E. 2020. The Sustainable Development Goals viewed through Gross National Happiness, Ubuntu, and Buen Vivir. *International Environmental Agreements*, 20: 431–458. https://doi.org/10.1007/s10784-020-09487-3

GNH highlights the importance of a holistic educational approach that ensures Bhutanese citizens gain a deep foundation in traditional knowledge, common values and skills. In addition to studying reading, writing, maths, science and technology, students are also encouraged to engage in creative learning and expression[35]. Values are fundamental to human beings as they shape people's choices and actions throughout their lives. In an attempt to reflect the holistic aspects of education, four indicators – literacy, educational qualifications, knowledge and values – are considered.

The Bhutan Education Blueprint 2014-2024[36] proposes rethinking education and taking radical steps to respond to the challenges and changing needs of the education system. The document is focused on the four educational dimensions of access, quality, equity and system efficiency. SDG 4.7 and the entire SDG 4, in a broader scope, is compatible with the threefold mission of Bhutanese education system as a whole.

Vision
An educated and enlightened society of GNH, built and sustained on the unique Bhutanese values of Tha-Dam-Tshig Ley Gyu-Drey.
Mission
1. Develop sound educational policies that enable the creation of a knowledge-based GNH society.
2. Provide equitable, inclusive and quality education and lifelong learning opportunities to all children and harness their full potential to become productive citizens.
3. Equip all children with appropriate knowledge, skills and values to cope with the challenges of the 21st century.

Source: **Bhutan Education Blueprint 2014-2024: Rethinking Education**

In relation to the SDG target 4.7 as well as indicator 4.7.1, quality education seems to be of particular interest in Bhutan. To achieve relevant transformation, "curriculum must foster acquisition of 21st century skills of innovation, creativity, enterprise and universal human values of peace and harmony. School leaders must be visionary and proactive to improve the school and teachers must use child-centred teaching and assessment approaches to promote understanding in all learners".

The Blueprint identifies eight shifts and forty initiatives to be implemented from 2014 to 2024, with the ultimate objective of improving student learning outcomes and their overall development. The expected results as defined in the Blueprint ("What success will look like?") are useful 'spotlights' in developing recommendations on opportunities for integrating SCP issues into National School Curriculum. Two shifts are of particular importance in rethinking National School Curriculum:

- Revamp curriculum and assessment to enhance student learning (Shift Two)
- Raise learning outcomes of students comparable to leading international standards (Shift Three).

Besides, all eight shifts of the Blueprint are mutually interrelated, compatible with global SDG 4 and necessary for its implementation. On the other hand, it is essential that the transformation of education in Bhutan is rooted in its original philosophy of development and culture.

Aspirations for Student Learning include both systemic shifts and significant quality improvements in student learning outcomes at the individual level. The Blueprint articulates Nine Student Attributes (outcomes) that every student in every school should develop (see also Annex 2).

35   Ura, K., Alkire, S., Zangmo, T. and Wangdi, K. 2012. *An Extensive Analysis of GNH Index*. Centre for Bhutan Studies, Thimpu. https://ophi.org.uk/wp-content/uploads/Ura_et_al_Extensive_analysis_of_GNH_index_2012.pdf
36   Ministry of Education. 2014. *Bhutan Education Blueprint 2014-2024: Rethinking Education*. Royal Government of Bhutan, Thimphu. http://www.education.gov.bt/wp-content/downloads/publications/publication/Bhutan-Education-Blueprint-2014-2024.pdf

Nine Student Attributes

Source: **Bhutan Education Blueprint 2014-2024: Rethinking Education**

A notable feature of the Nine Student Attributes is an intention to consider knowledge, skills and values in an integrative way leading to the desired result. Attributes reflect a meaningful balance between cognitive, non-cognitive and behavioural dimensions of learning outcomes and include essential elements (key abilities) of sustainability competence framework[37] as presented in Table 5. Although descriptions of the Attributes are slightly different, reflecting Bhutanese education philosophy and context, the parallels are clear:

• Knowledge and understanding • Intellectual competence • Enduring habits of lifelong learning	**Cognitive** ⟷	• Critical thinking competence • Systems thinking competence • Anticipatory competence (Futures thinking)
• Family, community and national values • Spirituality and character	**Non-cognitive** ⟷	• Normative competence • Self-awareness competence
• Communicative competence • Leadership competence • World-readiness	**Behavioural** ⟷	• Collaboration competence • Strategic competence • Integrated problem-solving competence

Similar to the above-mentioned documents, the National Education Policy (Draft)[38] aims to create a robust, inclusive and holistic education system that:

- inculcates the principles and values underpinning GNH and upholds the nation's unique cultural and spiritual heritage and values; and
- prepares citizens to become knowledgeable, skilful, creative, innovative and enterprising, capable of responding to national needs and emerging global trends.

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37   UNESCO. 2017. *Education for Sustainable Development Goals: Learning objectives*. https://unesdoc.unesco.org/ark:/48223/pf0000247444_eng
38   Royal Government of Bhutan. 2019. National Education Policy (Draft). Thimphu. http://www.education.gov.bt/wp-content/uploads/2021/09/National-Education-Policy-2019-Draft.pdf

The curriculum is seen as central to education and plays a vital role in achieving the purpose of education as defined under the policy goals.

In the first VNR Report[39] (2018), Bhutan reported that implementation of the SDGs, including SDG 4 on quality education, was well 'on track'. However, the target SDG 4.7 and indicator 4.7.1 were not specified.

In the second VNR Report[40] (2021), a summary of progress on the overall SDG 4 was presented, which is assessed to be 'at risk' at this point in time, given the immediate impacts of the COVID-19 pandemic on education. In relation of SDG 4.7, the following key developments should be noted: A 21st Century Education Roadmap is under development; Royal Kasho[41] issued for fundamental reforms in the education system; and implementation of Digital School initiatives under Digital Druk Yul flagship programme.

> *The Ministry of Education has made commendable efforts to initiate reforms in our education system. It is now time to give renewed life to these efforts by reorienting our school structures for the need and challenges of a different social context. We must revisit our curriculum, pedagogy, learning process, and assessments to either transform or rewrite them in view of the challenges and opportunities of the twenty-first century.*
> *<...>*
> *The new vision for our education system must encompass the drive to create enlightened citizenship that is as much local as it is trans-local.*
>
> The Druk Gyalpo, Royal Kasho on Education Reform[42]

Analysis of the education policy documents reveals the space for SCP education, or education for sustainability and global citizenship in a broader scope. Education policy in Bhutan reflects the main trends recognised internationally. At the same time, deep roots in traditional culture and ethics as well as coherence with the GNH philosophy brings an added value and uniqueness to the education sector and Bhutanese society at large. It is an essential precondition and opportunity to find authentic ways of implementing both national and global goals.

3.3. Analysis of the National School Curriculum

The National School Curriculum in Bhutan as well as curriculum policies and curricula worldwide are oriented on competences necessary for employability, personal fulfilment and health, active and responsible citizenship and social inclusion. However, there are challenges which are in focus and require both ethical and knowledge-based solutions; for example, the climate crisis, health and food, energy, use of nature resources, ecosystem- and bio-diversity, democracy, equity and solidarity. Education aims to empower young people and stimulate their initiatives for individual and societal transformation as well as to contribute in implementing SDGs. The development of transformative competences by learners is a prerequisite for action for sustainable development.

An overarching National School Curriculum Framework is a guide to the selection of learning experiences, outcomes, standards and assessment for all learning areas. It also seeks to promote the country's unique culture, traditions and values while promoting the learning to participate actively in the process of building an educated, enlightened and cohesive society[43].

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39   GNHC. 2018. Sustainable Development and Happiness. Bhutan's Voluntary National Review Report on the Implementation of the 2030 Agenda for Sustainable Development. Royal Government of Bhutan.
https://www.gnhc.gov.bt/en/wp-content/uploads/2018/07/VNR_Bhutan_July2018.pdf
40   GNHC. 2021. Transformations for Sustainable Development in the 21st Century. Bhutan's Second Voluntary National Review Report on the Implementation of the 2030 Agenda for Sustainable Development. Royal Government of Bhutan
https://www.gnhc.gov.bt/en/wp-content/uploads/2021/09/2nd-VNR-Report-SDGs.pdf
41   Royal Kasho is a royal edict or decree.
42   Royal Kasho on Education Reform, 2020. http://www.bbs.bt/news/?p=143221
43   Gyeltshen, K. and Zangmo, S. 2020. School Education in Bhutan. In Sarangapani, P. and Pappu, R. (eds) *Handbook of Education Systems in South Asia. Global Education Systems.* Springer, Singapore. https://doi.org/10.1007/978-981-13-3309-5_12-1

Bhutan National School Curriculum (2022) is organised according to the following components (see respective chapters "Curriculum Structure and Organisation"):

- Strands (learning content);
- Competency Based Standards (both according to the Key Stages and Classes); and
- Learning Objectives that include a detailed description of concepts and skills44.

It is recognised that competency is more than just knowledge or skills and involves the ability to meet complex demands, by drawing on and mobilising psycho-social resources (including skills and attitudes) in a particular context.

3.3.1. Learning content

As was shown in a previous chapter, SCP through the lens of global Sustainable Development Goals, SCP issues include a broad spectrum of interrelated themes of sustainable development presented in Table 1 and Table 2. In the context of the National School Curriculum it means involvement of different school subjects.

Education for sustainability in many countries around the world is related with environmental education (EE), particularly in countries with a long EE tradition. Actually, ESD and EE are distinct, although they do overlap and both are legitimate and necessary. At the same time, ESD must continue working with EE which brought a new view of human relationships with the world environment. When related holistically to all the SDGs, SCP based on ESD and GCED includes all mutually interdependent dimensions of sustainable development and often (as in a case of Bhutan) have a strong social and cultural background. It means that in education for sustainability different learning areas and school subjects should be taken into account.

Table 6 presents a summary of relevant subjects for SCP education according to the National School Curriculum. In defining appropriate subjects, it is important to consider not only the indicative Strands[45], but also Competency-based Standards and Class-wise Competencies, which are more specified and provide additional information on expected learning outcomes. Tables 6-1 to 6-8 present corresponding information for the subjects involved.

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44   Ministry of Education. 2022. Curriculum Frameworks. Department of Curriculum and Professional Development. https://rec.gov.bt/curriculum-frameworks/
45   Strands represent major themes to show a logical flow of learning, starting from the concepts to natural and human-made concerns to management and sustainability. Ibid.

Table 6
Subjects for SCP education for Key Stages* according to National School Curriculum Frameworks

Source: Ministry of Education, Department of Curriculum and Professional Development
https://rec.gov.bt/curriculum-frameworks/

Basic Education				Higher Secondary Education
Primary		Lower Secondary	Middle Secondary	
Key Stage 1 PP-III	Key Stage 2 IV-VI	Key Stage 3 VII-VIII	Key Stage 4 IX-X	Key Stage 5 XI-XII
Science (PP-VIII)			**Environmental Science** Biology, Chemistry, Physics (IX-XII)	
Health and Physical Education (PP-XII)				
Geography (PP-XII)				
	Social studies (IV-VI)	**History and Civics** (VII-XII)		
			Economics (IX-XII)	
			Agriculture for Food Security (IX-XII)	

* Key stage – any of the five fixed stages into which the national curriculum is divided, each having its own prescribed course of study. The school education structure in Bhutan comprises 11 years of free basic education from classes PP (Pre-Primary) to X, with seven years of primary education (PP–VI). After completing class X students either continue their education in higher secondary schools (XI-XII), enrol in technical training institutes, or enter the job market. After completing class XII, some students continue their studies at the tertiary education institutes, others enter the job market.

It is important to highlight a good correspondence of Competency-based Standards (Table 6-1 to 6-8) with the main SCP issues that are indicated in Table 2 in connection with the targets of SDG 12 as well as relevant collections of other SDGs. In this way SCP-related learning content covers at least four of the nine GNH domains, namely, Living standards, Health, Environment, and Good governance.

Table 6-1
Science Curriculum Framework (PP-VIII)

	Competency-based Standards	Class-wise Competences
Strand: Life Processes (Living Things and their Environment)		
Key Stage I PP-III	Explain the relationship between plants and animals based on habitat and food	**III** Identify the ways to protect food and habitat to promote a sense of belongingness
Key Stage II IV-VI	Examine the modes of adaptation in plants and animals, feeding relationships of organisms, and the role of microorganisms to recognise the interdependence of living things with their environment and care for them	**VI** Analyse trophic levels in the ecological pyramid to understand the energy flow in the ecosystem, and recognise their roles in maintaining the ecological equilibrium in the ecosystem
Key Stage III, VII-VIII	Study the means of adaptation and feeding strategies adopted by species in an ecosystem to understand the importance of interdependence of living beings, among themselves and with their environment	**VIII** Explore adaptation, bio-magnification, biodiversity, and breeding to understand how they function and the interdependence of living things with their environment and their effects on the sustainability of biodiversity
Strand: Materials and their Properties (Materials and Change)		
Key Stage I PP-III	Investigate objects which undergo changes due to Physical Processes such as heating, cooling, squashing, bending, twisting, stretching, etc. to adapt to the changes happening in nature	**III** Investigate the change in materials when heated or cooled to adapt to the changes happening in nature
Key Stage II IV-VI	Explain the effects of Physical Processes of heating and cooling of substances, and categorise the changes into physical and chemical	**VI** Investigate the various changes in and around to understand their characteristics and significance for nature and people's life
Key Stage III VII-VIII	Investigate the properties of physical and chemical change and relate their effects on the changes occurring in the natural environment to recognise their importance in day-to-day life	**VII** Investigate the conditions and features of physical and chemical changes, and relate them to everyday phenomena occurring in the natural environment
Strand: Physical Processes (Electricity)		
Key Stage I PP-III	Identify the sources of electricity, explore home electrical appliances, and describe safety measures for personal safety and well-being	**III** Explore different sources of electricity to recognise their uses in daily life
Key Stage II IV-VI	Explore the sources of electricity and explain the generation of electricity, circuits, and properties of magnets, and recognise their uses in our daily life.	**V** Explain how electricity is generated and transported and construct a series circuit to identify conductor and insulator; and investigate the properties of magnet to understand its use in different appliances.
Key Stage III VII-VII	---	---

Table 6-2
Environmental Science Curriculum Framework

Competency-based Standards

Key Stage IV
IX-X

Strand: Systems in Nature

- Exhibit understanding of the ecosystem and identify the effects of human activities on natural processes and inter-relationship in maintaining a balanced ecosystem in nature
- Analyse diverse factors that influence the ecosystem equilibrium and stability to understand the health of an ecosystem and communicate through the representations of flow charts and mathematical calculations

Strand: Environmental Issues and Concerns

- Use the understanding of the provisions of natural resources and the ecological footprint, develop an argument on how the human lifestyle is related to resource consumption to stimulate behaviour change of people for the sustainable well-being of people and the environment
- Demonstrate concern towards the environment by exploring the transformation of human dependence on natural resources with the change of human lifestyles, and exhibit behavioural change in consumption and waste generation patterns
- Evaluate the causes and impacts of pollution on humans and nature, and suggest preventive measures to reduce the ever-increasing pollution issues in the environment
- Design mitigation strategies and plans to manage and reduce the risk of disaster to save life, properties and the natural world

Strand: Natural Resource Management

- Illustrate conservation strategies and practise skills based on the issues and challenges towards mitigating the threats to biodiversity and the well-being of all life forms
- Explore ideas and processes of managing watersheds for the socio-economic benefits of the community, and suggest measures to conserve water resources
- Explain and design strategies for sustainable use of land resources and waste management for socio-economic development, and prevent land pollution for the well-being of people and the health of the environment
- Evaluate energy security of Bhutan and a few other countries in the light of energy resources and consumption patterns and their effects on the lives of people, to inform the decision on the design and use of diverse strategies to conserve energy

Strand: Sustainable Development

- Analyse the diverse perspectives of development and evaluate the significance of social, economic and environmental dimensions to identify ways and means towards achieving the sustainable development goals
- Recognise and promote sustainable development as a holistic developmental paradigm through the analysis of sustainable development initiatives

Strand: Systems in Nature

- Demonstrate environmental management abilities to contribute towards evidence-based production, utilisation and evolution of practices towards protecting the ecosystem
- Exhibit the understanding of the ecosystem, its spheres, functions, and interactions of various components, and explore measures to maintaining the balance in nature

Strand: Environmental Issues and Concerns

- Investigate change in the consumption patterns of people in relation to the increasing pressure on our natural resources, and explore ways to bring about change in consumption behaviour in the communities
- Demonstrate the understanding of natural resources and their degradation and their impacts on human life and communicate environmental information and ideas in diverse forms to influence the mindful practice of livelihood towards living in harmony with nature
- Organise awareness campaigns and secure funds to collaborate with innovative partners, and design technologies that would enable Bhutan to fight various forms of pollution
- Carry out research in various fields related to climate change, and suggest ways to control factors causing climate change towards reducing the impacts of climate change
- Plan and disseminate disaster management plans and activities for the family and the community they live in, and recognise the significance of disaster management to minimise the disastrous impacts on society

Key Stage V

XI -XII

Strand: Natural Resource Management

- Draw evidence from various research studies on the impacts of biodiversity loss, and demonstrate the skills to collaborate with various organisations to carry out conservation initiatives
- Demonstrate the understanding of the uniqueness of Bhutan's rich natural heritage and spiritual beliefs in nature, and suggest action to safeguard the natural heritage
- Evaluate water and land resources of our country or the locality to inform the needs for adoption of effective conservation strategies for their sustainable use, so that there are enough of these resources for all times to come
- Demonstrate an understanding about clean energy, energy security and sustainable energy use, and generate innovative ideas to conserve energy with appropriate strategies for sustainable energy resources

Strand: Sustainable Development

- Evaluate the impact of developmental activities on the environment, and suggest ways to manage the environment through the adoption of appropriate tools and techniques for sustainable resource management
- Develop a global and a national perspective of development through the lens of sustainable development and Gross National Happiness approach of development, and realise an individual's roles towards sustainable living and development
- Analyse national and international developmental policies based on the principle of sustainable development, and explore ways to contribute to sustainable development activities in the community
- Demonstrate concern, aptitude and interest to participate in the community development process to create ideas towards achieving the sustainable development goals.

Competency-based Standards	Class-wise Competences
BIOLOGY	
Strand: Ecosystems: Interactions, Energy and Dynamics	
Key Stage IV IX-X • Use the concept of interdependence to construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect organisms and their environment	**IX** • Apply the understanding of ecosystems to explain that disturbances to any of the physical or biological components of an ecosystem can lead to a shift in all its population, interactions, energy and dynamics **X** • Use the understanding that sustainable use of natural resources is essential to explain that any disturbance in the ecosystem can influence the quality and sustainability of natural resources • Use the concepts of interdependence amongst organisms to develop solutions to mitigate environmental pollution
Key Stage V XI-XII • Use the understanding of the effect of unsustainable anthropogenic activities on the environment in making scientific, economic, political and social decisions in maintaining biodiversity and a healthy environment	**XI** • Use the understanding of the effects of pollution on the environment to design solutions to minimise anthropogenic impact on the environment and to maintain sustainable use of resources **XII** • Use the understanding of the effect of unsustainable anthropogenic activities on the environment in making scientific, economic, political and social decisions in maintaining biodiversity and a healthy environment.
CHEMISTRY	
Strand: Materials and Change	
Key Stage IV IX-X	• Global Warming (Scope: greenhouse gases and their importance, explanation of global warming, natural and man-made causes of global warming, effects of global warming, mitigation towards cause of global warming, carbon sequestration)
Key Stage V XI-XII • Apply the knowledge of organic compounds and their interconversion to relate their importance and impact in daily life	• Apply the knowledge of the chemical composition and saponification to prepare a soap sample that may be used in a community • Research the quality of fats consumed by Bhutanese to assess the health risk associated with fats • Design a prototype to produce biofuel from oils, fats and local organic waste that may solve energy and environmental problems

PHYSICS

Key Stage IV IX-X	**Strand:** Fluid Mechanics and Thermal Physics	
	• Apply the scientific concepts to design a model of devices and infrastructures to minimise heat loss through different modes of heat transfer • Explore applications of different temperature scales and investigate the quantity of heat in different materials to make a right choice of materials for different purposes	**IX** • Carry out an experiment to investigate the mode of transfer of thermal energy (heat) to apply the concept in designing heat efficient devices **X** • Explain the exchange of heat between the system and surroundings to design a calorimeter to verify the principle of calorimetry • Illustrate the latent heat of fusion and vaporisation through experimentation and relate the concept to the natural phenomena
	Strand: Electricity and Magnetism	
	• Explain and apply the concepts of heating effect of current and electric power in different electrical appliances to identify the right choice of appliances for specific purposes	**IX** **–** **X** • Explain the concept of heating effect of current and electric power to relate its applications in the daily use of electrical appliances

Table 6-3
Health and Physical Education Curriculum Framework

Strand: Health and Healthy Lifestyle (HHL) for Well-being

	Key-stage competencies	Class-wise competencies
Key Stage I, PP-III	• Apply basic concepts and practices of personal hygiene and sanitation to promote healthy living • Make healthy food choices by using the knowledge and understanding of a balanced diet for personal health	• Identify hygienic practices and common individual waste disposal at home and in schools to prevent environment pollution • Practise healthy food habits for Go, Grow, and Glow to develop into healthy and efficient individuals
Key Stage II, IV-VI	• Apply fundamental concepts, strategies, and practices of good sanitation and hygiene for the promotion of active and healthy lifestyles • Make healthy food choices by applying the concept of a balanced diet to enhance personal health	• Dispose of individual waste in designated places and practice menstrual hygiene to protect environment from pollution • Compare and contrast lifestyle choices for healthy lifestyles and dietary habits for decision-making • Create a healthy eating plan applying the concepts of a balanced diet to promote healthy dietary habits

Key Stage III VII-VIII	• Apply healthy food habits with the understanding that a balanced diet is important for personal health • Apply fundamental concepts, strategies and practices of good hygiene and sanitation to promote healthy living	**VII** • Identify practices of maintaining personal hygiene and sanitation for individual adoption of healthy practices • Practise food safety at home and school by developing food safety plans to prevent food-related hazards **VIII** • Practise food safety and dietary habits for balanced nourishment of the body • Identify ways to sustain water supply schemes and the functionality of the WASH facilities in schools to optimise health benefits
Key Stage IV IX-X	• Practise healthy food habits with the understanding of the functional needs of a balanced diet for normal growth and development to enhance physical efficiency and health • Apply collaborative skills and techniques to promote Water Sanitation and Hygiene	**IX** • Adopt healthy eating habits to reduce the risk of nutrition deficiency and communicable diseases • Prepare strategies to collaborate with others to maintain clean water, sanitation and hygiene **X** • Follow food safety steps to prepare healthy daily meals. • Prepare strategies to collaborate with others to maintain clean water, sanitation and hygiene
Key Stage V XI-XII	• Apply the concept of a balanced diet to promote good health and prevent nutrition-related diseases • Apply the concepts and understanding of Water Sanitation and Hygiene (WASH) to promote health and hygiene in schools, homes and communities	**XI** • Identify WASH practices applicable to individual needs, and maintain zero waste in schools and communities for social well-being **XII** • Analyse effective dietary habits in promoting physical activities and sports performance • Identify ways to carry out simple operation and maintenance of WASH facilities for community health and vitality • Promote proper use and maintenance of WASH services and facilities for community well-being

Table 6-4
Geography Curriculum Framework

Strand: People and the Environment

	Competency-based Standards	Class-wise Competencies
Key Stage I, PP-III	• Demonstrate appropriate use of water for sustainable use	• Demonstrate appropriate use of water for proper usage Geography concepts are learnt through Social Studies, Science, Languages and Mathematics.
Key Stage II, IV-VI	• Analyse the sources and importance of water to understand ways of conserving water • Evaluate the causes and consequences of waste to understand ways of disposal by being aware of its impact on humans and the environment	• Analyse the importance of water for sustainable use • Evaluate the consequences of waste disposal to understand the human impact Geography concepts are learnt through Social Studies, Science, Languages and Mathematics.
Key Stage III, VII-VIII	• Evaluate the importance of natural resources and natural characteristics of a place for socio-economic development and their influence on culture and identity • Analyse the interaction between humans and the environment to understand the ecosystem for harmonious co-existence	**VII** • Evaluate the importance of natural resources for balanced socio-economic development of a country • Propose ways to minimise pollution to understand its impact on the environment **VIII** • Evaluate the importance of natural and human resources for balanced socio-economic development of a country. • Advocate ways to overcome waste disposal to understand its negative impact on the environment.
Key Stage IV, IX-X	• Explain the complex interaction amongst the spheres and analyse its impact on people and biodiversity • Examine the role of human geography to understand spatial diversity for a just and harmonious co-existence	**IX** • Assess the significance of natural resources to conserve the ecosystem for sustainable use • Examine human activities to understand spatial diversity for a just and harmonious co-existence • Analyse the interaction amongst the spheres and their impact on people and biodiversity **X** • Analyse the effects of interaction amongst the spheres to understand biodiversity • Assess the significance of natural resources to understand resource conservation and sustainable use • Examine the role of human activities to understand distribution of settlement and population

	Competency-based Standards	Class-wise Competencies
Key Stage V, XI-XII	• Assess the natural resources and their uses to explain the importance of conserving the ecosystem and the sustainable use of resources for socio- economic development • Examine the evolution of settlements to understand its significance for balanced socio-economic development of a place	**XI** • Assess different sources of information and data to plan for socio-economic development • Assess the significance of natural resources to conserve the ecosystem for sustainable use **XII** • Apply surveying techniques with available equipment and technology to plan the development of a place • Assess the significance of natural resources to understand the measures to conserve the ecosystem • Examine the function of economic activities to promote socio-economic development of a place

Table 6-5
Social Studies Curriculum Framework

	Competency-based Standards	Class-wise Competencies
	Strand: My World	
Key Stage II, IV-VI	• Analyse the sources and importance of water to understand ways of conserving water • Explore the benefits of forest to promote healthy and sustainable living	**IV** • Use inquiry skills to investigate the benefits of community forest to encourage the practice of community forest in the locality **V** • Analyse the importance of rivers systems in Bhutan, and understand the science of how they affect all the life forms on Earth • Explore the benefits of forests to promote healthy and sustainable living
	Strand: Human Well-being and the Environment	
Key Stage II, IV-VI	• Evaluate the causes and consequences of waste to understand ways of disposal by being aware of its impact on humans and the environment • Investigate social issues in the locality to understand their causes and to find better means for safe living	**IV** • Investigate the types of pollution to practise ways to reduce pollution for a clean and healthy environment in the community • Apply the knowledge and skills of safety measures to minimise the impacts of hazards and disasters **V** • Exhibit habits of environmental conservation to promote sustainable living • Apply the knowledge and skills of safety measures to minimise the impacts of hazards and disasters at home and in the community **VI** • Evaluate pros and cons of hydropower and urbanisation for maintaining a balance between development and environment • Apply the knowledge and skills of safety measures to minimise the impacts of hazards and disasters in the community

Strand: Economy and Living

Key Stage II, IV-VI	• Examine economic and non-economic activities of the community to understand how it contributes towards sustainable living/ development	**IV** • Examine the economic activities of the community to explore income generating opportunities for sustainable living **V** – **VI** • Analyse transport and communication for promoting social well-being of the community • Examine the local economy to suggest ways to improve the economy of the community for sustainable development

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Table 6-6
History Curriculum Framework

Strand: Bhutan History and Civics and Citizenship Education

	Competency-based Standards	Class-wise Competencies
Key Stage III, VII-VIII	• Explain the features of the Constitution of Bhutan, tracing its origin and purpose • Explain civic roles and citizenship skills through the understanding of civics and citizenship • Explain the four domains of citizenship in the light of civil, political, socio-economic and cultural contexts • Analyse the attributes of good citizens with reference to the concept of citizenship	**VII** • Respect for differences: The lessons on features of culture, cultural diversity and how it impacts social life enable learners to interact meaningfully with others, which will lead to unity and peace in society • Global Competence: Brief introduction to world civilisations, their features and impacts make learners aware, curious, and interested in learning about the world and how it works **VIII** • Civic Engagement: Lessons on the domains of citizenship and the attributes of a good citizen help learners grow into effective members of the community and enhance their ability to apply political knowledge and understanding to issues that concern them. In the process of defining a good citizen, learners are also encouraged to investigate issues, express their views, and take actions that make a difference in the communities, helping the learners to develop as more effective members of society.

Key Stage IV IX-X	• Discuss fundamental rights and duties to understand the attributes of citizenship • Assess the importance of Articles 3, 4 and 5 of the Constitution of Bhutan (in relation with spiritual heritage; cultural heritage; conservation of environment)	**IX** • Civic-Mindedness: The lessons on fundamental rights and duties develop common thoughts and goals in the community in which the learners live **X** • Civic Engagement: The lessons on social services develop active citizenship skills in learners • Responsible Citizen: The lesson on civil society prepares the learner to be responsible about his/her role in community, country and the world • Acceptance of Change and Continuity: The lessons on socio-cultural awakening allow learners to analyse the existing practices and beliefs, and explore adoption of new principles that suit the changing conditions
Key Stage V XI-XII	• Discuss the political, social and economic reforms of the monarchy as a symbol of unity in Bhutan • Evaluate the impact of regional and international organisations on Bhutan through an understanding of Bhutan's role in these organisations • Discuss the origin, types, purpose and theory of interpretation of the Constitution in connection with Bhutan	**XI** • Peaceful Co-existence: The lesson on the commonalities of ethnic groups helps learners realise the importance of promoting the concept of peaceful co-existence globally to enhance productive and meaningful lives and sustainable societies • Civic literacy: The lessons on different theories of origin of states and political theories equip learners to analyse and relate to the Bhutanese context. In addition, the lessons on socialism and capitalism from the historical perspective equip learners with information about the policies of the government, current economic and social conditions, and the major issues in the country. **XII** • Civic engagement: The lessons on exploring the avenues for civic engagement in the community find learners engaged meaningfully for a common cause and become responsible citizens • Global Citizenship: The lessons on international organisations help promote the concept of a global citizen among the learners. In addition, learners appreciate the interconnectedness and begin to respect cultural diversity and social justice, and to protect the planet Earth.

Table 6-7
Economics Curriculum Framework

	Competency-based Standards	Class-wise Competencies
	Strand: Individual Economics Unit	
Key Stage IV, IX-X	• Analyse different types of market to make better choices as a producer or consumer	**IX** • Interpret relationship between human wants and resources to analyse economic problems and choices • Draw the relationship between consumption and production to comprehend the forms of utility for satisfaction of human wants • Examine non-economic activities for social well-being **X** –
Key Stage V, XI-XII	• Examine equilibrium price and quantity under different market structures to analyse interaction between sellers and buyers in determining the actual market prices and volume of goods traded	**XI** • Illustrate supply function to understand the behaviour of the consumer in directing the producer to produce goods and services • Examine the demand and supply function to analyse interaction between sellers and buyers in determining the actual market prices and volume of goods traded **XII** –
	Strand: National Economy	
Key Stage IV, IX-X	• Discuss the nature of Bhutanese economy in the light of GNH as a guiding principle for economic development • Analyse the interdependence among economic sectors to understand their role in economic development	**IX** • Discuss GNH as the development philosophy and justify it as the middle path development principle for Bhutan • Examine non-economic activities to understand their significance of the social well-being • Discuss various sectors of an economy to recognise their contribution to economic growth and development **X** • Evaluate GNH as an alternative indicator of economic development to understand precedence of GNH over other indicators • Discuss the importance of public goods to instil a sense of responsibility and belongingness • Discriminate between growth and development to achieve a sustainable economy

Key Stage V, XI-XII	• Discuss GNH as a guiding principle for economic planning and development • Discuss various sectors of an economy to recognise their contribution to economic growth and development	**XI** • Analyse the objectives of five-year plans to understand resource allocation, prioritised sectors, GNH goals in the planning process and status of the country's economy • Analyse the trend of contribution made by economic sectors to recognise their roles in economic growth and development **XII** • Analyse the national and global economic issues to suggest remedial measures for economic way forward

Table 6-8
Agriculture for Food Security Curriculum Framework (elective)

Competency-based Standards	Class-wise Competencies
Strand: Individual Economic Unit	
Key Stage IV, IX-X • Analyse different types of markets to make better choices as a producer or consumer	**IX** • Interpret the relationship between human wants and resources to analyse economic problems and choices • Draw the relationship between consumption and production to comprehend the forms of utility for satisfaction of human wants • Examine non-economic activities for social well-being **X** –
Key Stage V, XI-XII • Examine equilibrium price and quantity under different market structures to analyse interaction between sellers and buyers in determining the actual market prices and volume of goods traded	**XI** • Illustrate supply function to understand the behaviour of the consumer in directing the producer to produce goods and services • Examine the demand and supply function to analyse interaction between sellers and buyers in determining the actual market prices and volume of goods traded **XII** –

Strand: National Economy		
Key Stage IV, IX-X	• Discuss the nature of Bhutanese economy in the light of GNH as a guiding principle for economic development • Analyse the interdependence among economic sectors to understand their role in economic development	**IX** • Discuss GNH as the development philosophy and justify it as the middle path development principle for Bhutan • Examine non-economic activities to understand their significance in social well-being • Discuss various sectors of economy to recognise their contribution to economic growth and development **X** • Evaluate GNH indicators as alternative indicators of economic development to understand the precedence of GNH over other measures • Discuss the importance of public goods to instil a sense of responsibility and belongingness • Discriminate between growth and development to achieve sustainable economy
Key Stage V, XI-XII	• Discuss GNH as a guiding principle for economic planning and development • Discuss various sectors of an economy to recognise their contribution to its economic growth and development	**XI** • Analyse the objectives of five-year plans to understand resource allocation, prioritised sectors and GNH goals in the planning process and status of the country's economy • Analyse the trend of contribution made by sectors of the economy to recognise their roles in economic growth and development **XII** • Analyse the national and global economic issues to suggest remedial measures for a way forward for the economy

SCP issues raised during consultations with stakeholders from different sectors are presented in Annex 3. Table 7 shows the coherence of SDG 12 targets with the topics suggested and further consideration by using Table 2 and Table 2-1. Besides, SCP issues mentioned by the stakeholders are mostly transdisciplinary that require a cross-curricular approach.

Table 7 **SCP issues suggested by stakeholders, according to the SDG 12 targets** Source: Stakeholder consultations		
	SDG 12 targets	**SCP issues**
12.1	Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries	• Green tourism/Sustainable tourism • Eco-friendly/ Environment-friendly construction/ Sustainable building and construction • Energy efficient buildings

12.2	By 2030, achieve sustainable management and efficient use of natural resources	• Sustainable use of natural resources • Sustainable use of local resources • Endangered species • Circular economy • Production cycle (source to end) • Economy of resources • Environmentally sound technologies • Energy efficiency/Energy saving/ Sustainable energy consumption • Climate resilience/ Climate footprint • Watershed management/ Water footprint
12.3	By 2030, halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains including post-harvest losses	• Food supply chain and food sustainability • Sustainable agriculture
12.4	By 2020, achieve environmentally sound management of chemicals and all wastes throughout their life cycle <...> reduce their release to air, water and soil to minimise their adverse impacts on human health and the environment	• Waste management
12.5	By 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse	• Refuse-Reduce-Reuse-Recycle (4Rs)
12.6	Encourage companies <...> to adopt sustainable practices and to integrate sustainability information into their reporting cycle	• Sustainable transport/ Sustainable mobility
12.7	Promote public procurement practices that are sustainable in accordance with national policies and priorities	• Sustainable products • Sustainable procurement/Green procurement
12.8	By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature	• Responsible consumers

It is also recognised at the international level within the OECD Programme for International Student Assessment (PISA) that solving real-world scientific problems requires focusing on socio-environmental systems and sustainability issues that include relevant knowledge from disciplinary subject areas. New ways of thinking and acting are needed to solve socio-environmental problems such as climate change, pandemics, water security and conservation of species including[46]:

- Economics, markets, institutions [SDG 12.6, 12.7]
- Population, migration, well-being [SDG 12.7]
- Ecosystems, natural resources, conservation [SDG 12.2, 12.5]
- Climate change, mitigation and adaptation [SDG 12.4]

46   OECD. 2020. PISA 2024 Strategic Vision and Direction for Science.
https://www.oecd.org/pisa/publications/PISA-2024-Science-Strategic-Vision-Proposal.pdf

- Sustainable food systems, nutrition, food security [SDG 12.3]
- Health, environmental health, pollution and spread of disease [SDG 12.4]
- Land use and change [SDG 12.2]
- Water, governance and water security [SDG 12.4]
- Energy supply, development of renewables, and retirement of carbon-based energy resources [SDG 12.4, 12.7].

Actually, all these issues fit very well with the SDG 12 targets and related SDGs (as marked in brackets by L. Galkute) and reflected in Table 1 and Table 2.

Table 8 (I - V) presents selections of SCP-relevant subjects for the respective Key Stages. It will be helpful for curriculum developers and teachers of different subjects to define cross-cutting themes for a particular Key Stage.

Table 8 SCP-relevant subjects for respective Key Stages

Table 8-I Key Stage I		
Subject	**Strand**	**Competency-based Standards**
Science	Life processes (Living things and their environment)	• Explain the relationship between plants and animals based on habitat and food
	Physical processes (Electricity)	• Identify the sources of electricity, explore home electrical appliances, and describe safety measures for personal safety and well-being
	Materials and change	• Investigate objects which undergo changes due to physical processes such as heating, cooling, squashing, bending, twisting, stretching, etc. to adapt to the changes happening in nature
Geography	People and the environment	• Demonstrate appropriate use of water for sustainable use
Health and Physical Education	Health and healthy lifestyle for well-being	• Make healthy food choices by using the knowledge and understanding of a balanced diet for personal health • Apply basic concepts and practices of personal hygiene and sanitation to promote healthy living

Table 8-II Key Stage II		
Subject	**Strand**	**Competency-based Standards**
Science	Life processes (Living things and their environment)	• Examine the modes of adaptation in plants and animals, feeding relationships of organisms, and the role of micro-organisms to recognise the interdependence of living things with their environment, and care for them
	Physical processes (Electricity)	• Explore the sources of electricity and explain the generation of electricity, circuits, and properties of magnets, and recognise their uses in our daily lives
	Materials and change	• Explain the effects of physical processes of heating and cooling of substances, and categorise the changes into physical and chemical.

Geography	People and the environment	• Evaluate the causes and consequences of waste to understand ways of disposal by being aware of its impact on the environment and on humans • Analyse the sources and importance of water to understand ways of conserving water
Health and Physical Education	Health and healthy lifestyle for well-being	• Make healthy food choices by applying the concept of a balanced diet to enhance personal health • Apply fundamental concepts, strategies, and practices of good sanitation and hygiene for the promotion of active and healthy lifestyles
Social Studies	My world	• Analyse the sources and importance of water to understand ways of conserving water • Explore the benefits of forest to promote healthy and sustainable living
	Human well-being and the environment	• Evaluate the causes and consequences of waste to understand ways of disposal by being aware of its impact on the environment and on humans • Investigate social issues in the locality to understand their causes and to find better means for safe living
	Living and economy	• Examine economic and non-economic activities of the community to understand how they contribute towards sustainable living/development

Table 8-III **Key Stage III**		
Subject	**Strand**	**Competency-based Standards**
Science	Life processes (Living things and their environment)	• Study the means of adaptation and feeding strategies adopted by species in an ecosystem to understand the importance of interdependence of living beings, among themselves and with their environment
	Physical processes (Electricity)	---
	Materials and change	• Investigate the properties of physical and chemical change and relate their effects to the changes occurring in the natural environment to recognise their importance in day-to-day life
Geography	People and the environment	• Analyse the interaction between humans and the environment to understand the ecosystem for harmonious co-existence • Evaluate the importance of natural resources and natural characteristics of a place for socio-economic development and their influence on culture and identity
Health and Physical Education	Health and healthy lifestyle for well-being	• Apply healthy food habits with the understanding that a balanced diet is important for personal health • Apply fundamental concepts, strategies and practices of good hygiene and sanitation to promote healthy living

Subject	Strand	Competency-based Standards
History and Civics	Bhutan history and civics and Citizenship Education	• Explain the features of the Constitution of Bhutan, tracing its origin and purpose • Explain civic roles and citizenship skills through the understanding of civics and citizenship • Explain the four domains of citizenship in the light of civil, political, socio-economic and cultural contexts • Analyse the attributes of good citizens with reference to the concept of citizenship

Table 8-IV
Key Stage IV

Subject	Strand	Competency-based Standards
Geography	People and the environment	• Explain the complex interaction amongst the spheres and analyse its impact on people and biodiversity • Examine the role of human geography to understand spatial diversity for a just and harmonious co-existence
Economics	Individual economics unit	• Analyse different types of markets to make better choices as a producer or consumer
	National economy	• Discuss the nature of Bhutanese economy in the light of GNH as a guiding principle for economic development • Analyse the interdependence among economic sectors to understand their role in economic development
Agriculture for Food Security	Sustainable agriculture practices	• Use the principles and practices of sustainable agriculture to explain the food and nutritional security of Bhutan • Apply the concepts and understanding of Agro-Ecological Zones (AEZs) to select and grow crops in AEZs • Use the concept and skills of nursery management practices to enhance sustainable forestry management
Health and Physical Education	Health and healthy lifestyle for well-being	• Practise healthy food habits with the understanding of the functional needs of a balanced diet for normal growth and development to enhance physical efficiency and health • Apply collaborative skills and techniques to promote Water Sanitation and Hygiene (WASH)
History and Civics	Bhutan history and civics and Citizenship Education	• Assess the importance of Articles 3, 4 and 5 of the Constitution of Bhutan (in relation to spiritual heritage, cultural heritage, and conservation of the environment) • Discuss fundamental rights and duties to understand the attributes of citizenship
Environmental Science*	• Systems in Nature • Environmental issues and concerns • Natural resource management • Sustainable development	• A comprehensive list of respective Competency-based Standards is presented in Table 6-3

Table 8-V Key Stage V		
Subject	**Strand**	**Competency-based Standards**
Geography	People and the environment	• Assess the natural resources and their uses to explain the importance of conserving the ecosystem and sustainable use of resources for socio- economic development • Examine the evolution of settlements to understand its significance and the balanced socio-economic development of a place
Economics	Individual economic unit	• Examine equilibrium price and quantity under different market structures to analyse interaction between sellers and buyers in determining the actual market prices and volume of goods traded
	National economy	• Discuss GNH as a guiding principle for economic planning and development • Discuss various sectors of economy to recognise their contribution to economic growth and development
Agriculture for Food Security	Sustainable agriculture practices	• Use concepts and skills of sustainable agriculture practices to address and mitigate the threats to sustainable agriculture. • Apply the principles of agroecology to maintain productivity, sustainability, stability, equitability and autonomy of crop production • Use the concepts of climate resilient agricultural practices to mitigate the effects of climate change on agriculture and enhance food production • Apply the concepts and values of organic farming practices to promote consumer preferences and food safety
Health and Physical Education	Health and healthy lifestyle for well-being	• Apply the concept of a balanced diet to promote good health and prevent nutritional diseases • Apply the concepts and understanding of Water Sanitation and Hygiene (WASH) to promote health and hygiene in schools, homes and communities
History and Civics	Bhutan history and civics and Citizenship Education	• Discuss the political, social and economic reforms of the monarchy as a symbol of unity in Bhutan • Evaluate the impact of regional and international organisations on Bhutan through the understanding of Bhutan's role in these organisations • Discuss the origin, types, purpose and theory of interpretation of the Constitution in connection to Bhutan
Environmental Science*	• Systems in Nature • Environmental issues and concerns • Natural resource management • Sustainable development	• A comprehensive list of respective Competency-based Standards is presented in Table 6-3.

Cross-cutting theme means an important curriculum content that is to be covered across subjects (or disciplines or learning areas) rather than being taught and learnt in one particular subject. These themes can connect programme content across disciplinary boundaries, enrich the curriculum without overloading it through the introduction of additional teaching subjects, and facilitate interdisciplinary thinking and collaborative learning.

In the National School Curriculum Frameworks for different subjects there are different provisions of interpretation of cross-curriculum.

- In the Science framework interlinkages are indicated between pairs of selected subjects/ learning areas, for example, Science and History, Science and Mathematics, Science and Geography.
- The Geography, Social Studies, History and Health and Physical Education frameworks have a statement about the interdisciplinary nature of these subjects. It suggests an opportunity to explore multiple views and practise synergistic development of relevant skills.
- The Agriculture for Food Security framework, similarly, recognises an interdisciplinary or integrative design thus promoting connections with content and instructional practices of other subjects.

A different approach is suggested in the **Economics Curriculum Framework** by providing specific broad themes for cross-curricular study, such as

- Citizenship: culture and religion; indigenous knowledge and culture for a sustainable future; citizenship and civic literacy; democracy, sociology, consumer rights and obligations.
- Sustainability: sustainable development; sustainable agriculture; sustainable tourism; sustainable communities; resource consumption; studies of society and economic development, habitat and learning.
- Global awareness: understanding world hunger; population and development; climate change; desertification; freshwater depletion; equality; diversity and inclusion; local need-based study; international affairs; education for peace; and education for diversity.

These overarching themes within the Economics Curriculum Framework are compatible with SCP education as well as with ESD and GCED, and provide space for exploring SDGs and development sustainability competences. However, **specific models or scenarios for cross-curriculum should be further elaborated.**

3.3.2. Learning outcomes

Learning outcomes are statements that articulate what results should be achieved in a certain period of learning or in a particular learning activity. Different categories are defined in relation with learning outcomes in the National School Curriculum, namely, "Key Competences", "Competency Based Standards" and "Class Wise Competencies" as well as "Learning Objectives" and "Core Concepts and Skills".

Learning outcomes and learning objectives are often used interchangeably, but they are different as they reflect perspectives of teacher versus student. Learning objective states the purpose of a learning activity (why it is needed) and the intended result from the perspective of the teacher. Learning outcome identifies what the learner will gain from the learning activity, how they will be able to apply their new knowledge in different contexts. Learning outcome describes an observable action, a description of what the learner will be able to do and under which conditions, and the performance level they should be able to reach. **A competence, as a learning outcome, means the proven ability of the learner to apply knowledge and skills in value-driven activities, in different learning settings and real-life situations.**

Because of the complexity of sustainability issues, special attention should be paid to transferrable competences which are not related to a particular academic discipline or area of knowledge, and can be used in a wide variety of situations, learning settings or forward-looking projects.

Table 9 presents Key Competencies for school subjects indicated in National School Curriculum frameworks. Concerning the definition of Key Competences (or 21st century competencies)[47] mentioned

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47   Bhutan's National Education Assessment Framework 2019.
https://allchildrenlearning.org/resources_type/bhutans-national-education-assessment-framework-2019/

most often are critical and innovative thinking, creativity, problem solving, collaboration, communication and global citizenship. These competences actually are transversal competencies to be used in various contexts and various situations. Key Competences are developed and applied in different subjects and considered from different perspectives. In this way sustainability issues, in line with the GNH philosophy, create an additional space for efficient development of transferable competences.

Table 9 Key competencies for school subjects indicated in National School Curriculum Frameworks				
Key Stage 1	Key Stage 2	Key Stage 3	Key Stage 4	Key Stage 5
Science			**Environmental Science**	
Spirituality and values; Language; Transversal competencies (Critical and innovative thinking; Interpersonal skills; Global citizenship; Physical and psychological health; Enterprising and industrious); Sustainable living; Health, safety and well-being (Health and safety; well-being); Digital competence				
Health and Physical Education The core competencies are the ability of a learner to lead a productive, quality and happy life through routines of active and healthy lifestyles				
Geography Values and spirituality; Language and communication; Transversal competencies; Enterprising and industrious; Sustainable living				
	Social Studies Spirituality and values; Thinking about thinking; Language, symbols, and texts; Self-management; Relating to others; Collaboration; Industrious and enterprising; Digital competence	**History and Civics** Globally competent and nationally rooted; Historical empathy; Civic engagement; Media literacy; Historical research and analysis		
			Economics • Essential competencies (common and cross-cutting): • Collaboration; Critical thinking; Creative thinking; Problem solving and reasoning; • Decision making; Leadership • Core competencies (economic): • Entrepreneurship; Financial literacy; Information literacy; Digital literacy; Global citizenship	
			Agriculture for Food Security Spirituality and values; Language; Transversal competencies; Enterprising and industrious; Sustainable living; Health and well-being; Digital competence	

As was emphasised in chapter 3.2, the overarching learning outcomes in Bhutan are defined as Nine Student Attributes, namely, knowledge and understanding; intellectual competence; communicative competence; enduring habits of lifelong learning; family, community and national values; spirituality and character development; physical well-being; leadership competence, and world-readiness. Attributes include constructs of Key Competences (21st century competencies) and are compatible with sustainability competence framework and, in many cases, are based on analogous constructs.

In the context of sustainable development, a systems thinking competence seems to be of particular importance. It is emphasised in a range of international policy documents. Systems thinking is not mentioned explicitly in the National School Curriculum, although the learning content in some subjects already calls for understanding and dealing with complexities. For example, investigation of ecosystems could be a good starting point.

On the other hand, Intellectual Competence (see Annex 2, Nine Student Attributes) actually defines the main features of systems thinking: "Every student needs to possess a spirit of inquiry and learn how to continue acquiring knowledge throughout their lives, to be able to connect different pieces of knowledge. Immersed in a dynamic culture of learning characterized by innovative curricula, creative pedagogies and authentic assessment of learning, students will develop higher-order thinking skills such as the ability to analyse, synthesize or evaluate information, judge complex situations through critical reasoning, anticipate and seek creative solutions to problems. They will master a range of cognitive skills that include the ability to innovate, to generate new possibilities, and to create new ideas or knowledge."

3.3.3. Student assessment

The National School Curriculum Frameworks for subjects define "Teaching and Learning Approaches" as well as "Assessment and Reporting".

Teaching and learning can be implemented by using different approaches. It is important to distinguish between different terms: approach, method and technique, although often they are used interchangeably. An *approach* is a way of looking at teaching and learning, that is, a theoretical concept that describes how learning should be facilitated. *Teaching method* refers to the pedagogy and knowledge management strategies used for classroom instruction. *Teaching technique* is a well-defined procedure used to accomplish a specific activity or task.

In a competence-based curriculum, student assessment represents an integral part of the entire pedagogical process targeted at understanding and improving teaching and learning in order to achieve learning outcomes. From a constructivist perspective, competences cannot be taught but have to be actively acquired by the learner him- or herself. Within the National School Curriculum, common approaches that are relevant to competence-oriented sustainability education include: Learner-centred learning; Place-based learning; Differentiated/ Individualised/ Personalised learning; Autonomy, flexibility and adaptability; Reflective practices.

At the same time, there should be more focus on action-oriented transformative learning that promotes inquiry, future-oriented thinking, collaboration, and integrative problem-solving based on systems thinking.

Student assessment needs to correlate with teaching and learning approaches. All curriculum frameworks for subjects under consideration laid emphasis on formative assessment, which refers to frequent, interactive assessments of student progress to identify further learning needs and adjust teaching appropriately. Students who may not perform well in certain tasks have the opportunity to demonstrate their knowledge and skills in others. Such varied assessments also draw out information on students' ability to transfer learning to new situations – a skill emphasised as important to learning to learn – and on how student understanding might be corrected or deepened.[48]

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48   OECD and CERI. Assessment for Learning: Formative Assessment. https://www.oecd.org/site/educeri21st/40600533.pdf

However, in a competence-based curriculum the emphasis should be on self-assessment (assessment as learning – see chapter 2.2). The idea here is to enable students to begin to learn about themselves as learners. In this sense students will begin to self-regulate their own learning. Assessment as learning creates reflective students who have the agency to decide on their next learning step. This is particularly important in lifelong learning.

In the National School Curriculum, assessment as learning approach is mentioned in the Social Studies Curriculum Framework and in the Economics Curriculum Framework. "Students need frequent opportunities to reflect on where their learning is at and what needs to be done to achieve their learning goals. When students are actively involved in assessing their own next learning steps and creating goals to accomplish them, they make major advances in directing their learning, and what they understand about themselves as learners."[49] This statement should be mainstreamed in all subjects as an essential instrument both in competence development and lifelong learning.

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49   Economics Curriculum Framework. https://rec.gov.bt/curriculum-frameworks/

Conclusions

It is important to highlight strong preconditions for promoting SCP education as a core component of education for sustainable development and global citizenship education in the National School Curriculum. It is defined by

- Interplay and coherence between the philosophy of GNH and sustainable development, with particular emphasis on humanistic values and ethics.
- Political support to implementing the 2030 Agenda for Sustainable Development by United Nations, including SDG 4 (Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all).
- Target SDG 4.7 on development of higher order transversal competences (key competences) as the essential condition of transformative action, which is also supported by the targets SDG 12.8 and SDG 13.3.
- Correlation between Nine Student Attributes (learning outcomes) at the national level and the globally recognised key competences for sustainability.
- Learning content for different subjects that covers the main SCP issues as defined by SDG 12 and corresponding targets.
- Formative assessment of student achievements and emerging preconditions for self-directed learning.

For mainstreaming SCP education in the National School Curriculum, two major factors seem to be critical:

1. Coherence of learning outcomes and learning objectives

In implementing competence-based curriculum it is necessary to establish clear interlinkages between the Nine Student Attributes and Key Competences as the main building blocks (or constructs) of the Attributes from one side, and connections between Learning Objectives and Key Competences, from the other side.

Attributes

$\updownarrow$

Key Competences

$\updownarrow$

Learning Objectives
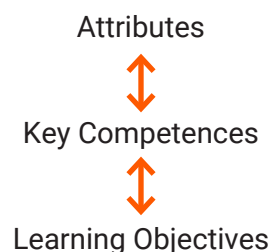
For this purpose, a description of Key Competences in terms of knowledge, skills and attitudes should be provided. Table 10 presents a description of systems thinking competence as an example. Such descriptions can be transformed into rubrics which would serve both as guidelines for teachers in formative assessment as well as for students' learning and self-assessment.

Systems thinking	To approach a sustainability problem from all sides; to consider time, space and context in order to understand how elements interact within and between systems
Knowledge	1. Knows that every human action has environmental, social, cultural and economic impacts 2. Knows that human action influences outcomes across time and space, leading to positive, neutral or negative results 3. Knows about life cycle thinking and its relevance for sustainable production and consumption 4. Knows the main concepts and aspects of complex systems (synthesis, emergence, interconnectedness, feedback loops and cascade effects) and their implications for sustainability 5. Knows the United Nations SDGs and is aware of interconnections and possible tensions between individual goals
Skills	1. Can describe sustainability as a holistic concept that includes environmental, economic, social, and cultural issues 2. Can assess interactions between environmental, economic, social, and cultural aspects of sustainability action, events and crises (e.g., migration caused by climate change or wars caused by resource scarcity) 3. Can assess how humans and nature interact across space and time 4. Can use life cycle thinking to analyse the risks and benefits of human action 5. Can identify in a system those challenges and opportunities that have the greatest potential to trigger change for sustainability.
Attitudes	1. Acknowledges the root causes of unsustainability for which humans are responsible, such as climate change 2. Has a holistic grasp of connections and interactions between natural events and human actions 3. Is concerned about the short- and long-term impacts of personal actions on others and the planet 4. Cares about systemic consequences of environmental crises for current and future generations and for other species 5. Is concerned about unpredictable cascade effects of human action

The process of developing competence is influenced not only by the subject content that students study, but also, and especially, by how they work and by the nature of the interaction between the learner and the environment. The feedback that students receive, along with the guidance and support for learning, influence their attitudes, motivation and willingness to act.

Each subject builds students' transversal competences through the concepts, content and methods typical of that discipline. Therefore, Learning Objectives of different school subjects should be connected with the statements of Key Competences. This would support teachers in promoting the development of transversal competences coherently with subject knowledge and skills.

2. Agreement on cross-curricular approach

The world outside school rarely fits the narrow boundaries of a single academic discipline or subject. Cross-curriculum connections make learning more holistic and meaningful for learners. Learners develop the understanding that real-life problems call for the application of knowledge, skills and values from diverse fields of studies.

There are different categories of the cross-curricular approach[50] in teaching and learning.

- Multidisciplinary (mainly content-based, the same topic is illustrated from the perspectives of the different disciplines and diverse perspectives).
- Interdisciplinary (mainly process-based, by combining theories, methodologies and perspectives from two or more disciplines).
- Transdisciplinary (teaching and learning is organised around the construction of meaning in the context of real-world problems or themes, involving all relevant disciplines).

Presented below are different possiblities for integrating SCP topic in the curriculum.

Multidisciplinary　　**Interdisciplinary**　　**Transdisciplinary**
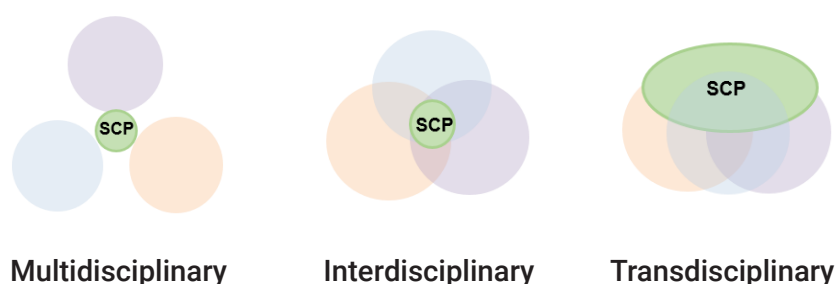
There is a possibility to add SCP topic to one subject as a particular case of the Interdisciplinary model. However, there is a risk of limited (one-sided) interpretation and additional time needed in the subject syllabus.

SCP issues (or SDGs, in a broader scope) actually are transdisciplinary. They provide opportunities to enrich the learning content by significant topics, where most appropriate and authentic, allowing students to engage with and better understand their world.

Integration of SCP in the curriculum does not mean inserting new thematic modules into an already overcrowded curriculum or minimising the importance of academic content. Instead, it is about reorienting subjects to achieving higher order learning outcomes by a double-purpose process: students acquire subject knowledge and skills and, at the same time, learn how to contribute to a sustainable transformation of society.

Sustainability issues need to be reflected in the content of what teachers teach and the pedagogy they implement, rather than being treated as add-ons to the main curriculum. Many of the issues call for co-creating knowledge with practitioners, stakeholders and policy-makers.

This 'double-purpose' of learning is particularly important for the competence-based curriculum. It seeks to empower youth to navigate the increasingly complex world and engage with it creatively and responsibly.

By ensuring the coherence of learning outcomes and learning objectives, and the cross-curricular approach outlined in this chapter, an important and continuous change process is set in motion. By also assuring that there is stronger focus on action-oriented transformative learning that promotes inquiry, future-oriented thinking, collaboration, and integrative problem solving based on systems thinking, Bhutan would be well placed to promote SCP education as a core component of education for sustainable development and global citizenship education.

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50   Glossary of Curriculum Terminology. UNESCO, International Bureau for Education. http://www.ibe.unesco.org/en/glossary-curriculum-terminology

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https://allchildrenlearning.org/resources_type/bhutans-national-education-assessment-framework-2019/

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Annex 1

Bhutan: National Report on Sustainable Consumption and Production

Author: Lam Dorji

Contents

List of Tables

1. Executive Summary

This report specifically covers sustainable consumption and production (SCP) status and trends in Bhutan, gathered from desktop research and stakeholder consultation, and draws conclusions about the SCP priority issues in the country. This report is structured into several headings with more focus on i) reviewing national and sectoral policies that indicate promotion of SCP practices; ii) the current status that showcases its achievements, and highlights challenges in the implementation of SCP; iii) establishing possible interlinkages or interaction between Sustainable Development Goal (SDG) 12, and GNH and other SDG goals showing synergy and indicating a broad compatibility of indicators, where progress in one indicator is associated with the fulfilment of another in the same goal; iv) identifying sectors that significantly contribute towards achievement of SCP targets; and v) recommendations and outlook, highlighting the gaps and the challenges ahead that will aid Bhutan in achieving SCP.

1.1 Policies and Strategies for SCP

The existing legal framework in Bhutan is highly favourable for the concept of SCP. The starting policy for Bhutan that delivers SCP-related transformative actions, was '*The Middle Path' National Environment Strategy,* operationalised in 1998 and updated in 2020. The Constitution of the Kingdom of Bhutan, adopted in 2008, also commits to secure, ecologically balanced sustainable development while promoting justifiable socio-economic development and put policy instruments in place to encourage the practice of SCP. The latest Economy Development Policy 2016 incorporated various sustainable aspects in Bhutan's economy growth by prioritising energy efficiency, better building and product standards, and local production and consumption (RGoB, 2010).

Bhutan has always been dedicated to sustainable development and has constantly engaged in global environmental action. The country signed multilateral environment agreements derived from Rio Summit 1992. All these multilateral environmental agreements helped the government to develop and strengthen national policies that pursue sustainable development.

1.2 SCP status and trends in Bhutan

Royal Government of Bhutan worked directly with international agencies and under various components to support SCP. These included i) implementation of Green Public Procurement, ii) sustainable tourism and efficient industrial development, ii) carrying out an analytical study applying SCP Hotspots Analysis Tool (SCP-HAT) to measure the performance against targeted indicators to provide scientific evidence, iii) publishing a few reports purely dedicated to SCP status and trends in Bhutan, and iv) drafting the *National Sustainable Consumption and Production Strategy and Action Plan −2030.* Other initiatives in practice include a nation-wide ban on plastic bags; paperless operations guidelines; heavy restrictions on private logging; maintaining 50 percent of the land cover as protected areas network and habitat corridors; decentralising control over natural resources and handing it to local communities; promoting good governance; and providing more effective resource management.

1.3 Gaps, Challenges and Recommendations

As a proactive measure, Gross National Happiness (GNH) is prioritised over Gross Domestic Product (GDP) as the core of Bhutan's development philosophy. The fundamental ideas of GNH can be regarded as a sustainable consumption and production indicator developed in response to dissatisfaction with the conventional gross domestic product measures, which do not capture many aspects that are central for people's wellbeing.

Yet, Bhutan still lacks understanding of the significance of life cycle thinking and a systems approach. Despite the favourable context, most sectors of the economy in Bhutan encounter difficulties in implementing sustainable consumption and production practices and developing sustainable habits due to lack of knowledge, capacity and poor enforcement of existing laws. The consumers, business and public sectors, decision-makers in Bhutan lack knowledge about SCP and there is a need to bridge

different actors' knowledge with science and concrete application. The transition towards a more SCP economy will require massive response at the level of industry, government, public-private sector and multi-stakeholder partnerships. It will eventually demand radical transformation of education and training systems in Bhutan. Greener and more sustainable products and services require availability of new skills for their production and maintenance. Presence of greener technologies requires specialisation that might not yet exist and specialists who do not possess all required skills.

Many areas of SCP overlap, indicating challenges from the perspective of knowledge development. The complexity of the SCP area requires an understanding of the problem, analysing it, identifying solutions (linking theory to practice), and understanding the consequences of such interventions.

The education of policymakers is essential as they will pave the way for legislation and policies that will drive and support the transition towards SCP. Changing of behaviour requires an even broader approach. Integrating SCP into education is crucial to changing people's mindsets regarding the relationship between nature and economic growth. This investment in creating awareness among the youth is considered impactful, as, if done right, students are likely to practice concepts and perspectives learnt in school in their family, daily life, and later on, in their workplace.

2. Introduction

The issue of sustainability is at the centre of Bhutan's development efforts pursued through its Gross National Happiness philosophy. While the country embraces modernisation through various economic dimensions, the Government of Bhutan is faced with the daunting task of meeting its development requirements in the wake of the growing scarcity of resources and capacity, and of ensuring protection and preservation of the environment. If balanced policy interventions are not implemented in time, development activities are likely to undermine nature's capability of regeneration, thereby endangering the security and wellbeing of the future generations.

Sustainable development can only be possible if there is sustainable consumption and production of goods and services at all levels. SCP promotes economic development and social welfare by providing markets for sustainable products and services, and by limiting negative effects on the environment. However, with economic growth as an important priority, ensuring sustainable consumption and production is easier said and done. The surge in income levels of the people, stimulated by the steady economic growth, resulted in increasing the demand for goods, thus exerting enormous pressure on the limited resources for production.

SDG 12 calls for "responsible consumption and production". It aims at decoupling economic growth from environmental damage and natural resource exploitation. Its eight targets include implementation of the 10-Year Framework of Programmes on SCP, efficient management and use of natural resources, cutting various types of waste, and responsible management of wastes and chemicals. It also calls for adoption of sustainable practices in companies and in public procurement.

The cause-and-effect relationship between SDG 12 and other goals and targets shows synergistic relations indicating a broad compatibility of the indictors, where progress of one indicator is associated with the fulfilment of another one in the same goal.

Bhutan is doing well in putting policy instruments in place to encourage the practice of SCP. For instance, the National Environment Commission is undertaking several SCP-related policy initiatives, such as mainstreaming SCP into national policies, supporting sustainable hotels and sustainable public procurement, integrating SCP learning in vocational education and initiating paperless office operations in the public sector. In order to discourage fossil-fuel-based transport, the government has imposed a 5 % green tax on fossil fuel and on the import of fossil-fuel-based vehicles. In 2008, Bhutan's tourism policy changed from "high value – low volume" to "high value – low (environmental) impact", indicating a strategy direction towards sustainable tourism. One of the objectives of the 11th Five Year Plan was to achieve "self-reliance and inclusive green socio-economic development". In the same vein, the latest Economy Development Policy 2016 aims to incorporate various sustainability aspects in Bhutan's economic growth by prioritising energy efficiency, better building and product standards, and local production and consumption.

Despite the initiatives noted above, Bhutan has not advanced much in adopting sustainable consumption and production patterns, particularly in reduction of food waste (including post-harvest losses), sound management of waste (including chemical waste), reduction of waste generation, incorporation of sustainable practices in industry, sustainable reporting, and adoption of sustainable lifestyles.

SCP covers a wide range of topics that could facilitate the decoupling of economic growth from natural resource use. Since it focuses on the environmental impacts of economic activity, many interlinkages exist between SCP and other SDG goals and targets. Achieving SDG 12 will require collaboration across sectors and a strong national framework integrated into sectoral policies and plans, business practices and consumer behaviour. Many areas of SCP, often overlapping, indicate challenges from the perspective of knowledge development. The complexity of the SCP concept requires broadening learning orientation from understanding of the problems, analysing them, identification of solutions, focusing on the proposed solutions to understanding the consequences of intended interventions.

Shifting to SCP will require fundamental changes in the way society operates and how people live their lives. This requires addressing the major drivers of consumerism and overconsumption as well as unequal consumption opportunities in modern society. Education and access to information will serve as catalysts to kick-start this social transformation. The government's Second Voluntary National Review report to the United Nations High-Level Political Forum also stressed the need to build capacity on scientific methodologies and tools to support the design and implementation of SCP at all levels.

A SWITCH-Asia stakeholder consultation meeting held on 6 March 2019 at Thimphu identified core SCP issues such as product and material life cycles, natural resources use, environmental impact of transnational trade, and thermodynamics of energy production and consumption. These issues are covered substantially only at the tertiary education level for students of related programmes. The SCP learnings are included in the Technical and Vocational Education and Training curriculum. Beyond that, infusing basic units on SCP into the school curriculum and linking them with sustainable behaviour were recognized as a valuable proposition for society as it would help pave the way for a long-term change.

3. Gross National Happiness as Bhutan's Development Philosophy

In the early 1990s, Bhutan was well aware that development is a double-edged sword, especially if not properly anticipated and fully prepared for. Bhutan recognized that inappropriate or uncoordinated development could pose threats to the integrity of Bhutan's natural resources from increasing developmental activities. If left alone to seek its own course, the process of development would continue to extract an increasingly heavy price from both land and people. Thus, as a proactive measure, the nation took charge of the direction and pace of the development process, reaffirming and taking Gross National Happiness (GNH) rather than Gross Domestic Product (GDP) as the core of its development philosophy (Planning Commission, 1999). Fundamental to the GNH approach was to integrate socio-economic development, environmental protection and cultural preservation as mutually inclusive, to foster prosperity and support the sustained happiness of the people. GNH is thus the overall guiding development philosophy of Bhutan. Over the years, GNH has also gained wide international recognition as an alternative model for socio-economic development. The operational aspects of GNH have been strengthened, most notably with the introduction of the GNH Index in 2008 and the GNH Policy Screening Tool in 2009. The GNH Index score has been used for the first time in the 12th Five Year Plan as one of the criteria to determine resource allocation to the local governments (*Dzongkhag, Gewog, Thromde*) – with lower GNH Index score receiving higher allocation of resources (GNHC, 2019, p.10).

The GNH policy screening tool assesses whether introducing a new policy has a favourable effect on GNH or not. It is a tool with 33 variables representing the nine domains of GNH on a scale of 1 to 4 (1 representing negative impact, 2 uncertain, 3 no negative impact, and 4 positive impact). For the policy to be GNH favourable, a minimum score of 66 is required. GNH, thus, can be regarded as an SCP indicator developed in response to dissatisfaction with the conventional GDP measure, which does not capture many aspects that are central to people's wellbeing.

4. Policies and Strategies for Sustainable Consumption and Production

The starting policy for Bhutan that delivers SCP-related transformative actions was 'The Middle Path' National Environment Strategy, operationalised in 1998 and updated in 2020, to achieve sustainable development through improved environmental planning, policymaking and management [NEC, 2020]. The launch of Bhutan Vision 2020 Strategy in 2001 was a significant step to achieve a low carbon economy.

Box-1: Policies Promoting SCP

i. 'The Middle Path' National Environment Strategy (1998) updated in 2020.

ii. Bhutan Vision 2020 Strategy (2001)

iii. National Strategy and Action Plan for Low Carbon Development (2012)

iv. Alternative Renewable Energy Policy (2013)

v. National Biodiversity Strategy & Action Plan (2014)

vi. Economic Development Policy (2016)

vii. National Energy Efficiency & Conservation Policy (2019)

viii. National Waste Management Strategy (2019)

ix. Cottage and Small Industry Policy (2019)

x. Tourism Policy of the Kingdom of Bhutan (2020)

xi. Sustainable Hydropower Development Policy (2021)

The Constitution of the Kingdom of Bhutan was adopted in 2008, creating a new system of democratic constitutional monarchy governance [RGoB, 2008]. Article 5 of the Constitution reflects the commitment to secure ecologically balanced sustainable development while promoting justifiable socio-economic development. The equitable socio-economic development and environmental conservation are two of the four pillars of Bhutan's development model, guided by the philosophy of GNH, where conservation of nature is a critical component in achieving happiness and wellbeing. As per the Constitution's Article 5.1, *"it is the fundamental duty of every citizen to contribute to the protection of the natural environment, conservation of rich biodiversity of Bhutan and prevention of all forms of ecological degradation",* thereby making the people of Bhutan responsible for the preservation of the natural environment, while the government shall ensure its conservation through adequate policies to maintain a minimum of 60 % of the land under forest cover in perpetuity *(Article 5.3)* and part of the territory shall be designated as protected areas *(Article 5.5).* Accordingly, the government's commitment was manifested through the adoption of many policies and laws as listed in **Box-1,** that promote the preservation and sustainable use of natural resources.

Bhutan has always been dedicated to sustainable development and has engaged in global environmental action. The country signed the multilateral environment agreements derived from the Rio Summit in 1992. it ratified the Convention on Biological Diversity (CBD), the United National Framework Convention on Climate Change (UNFCCC) in 1995, and the United Nations Convention to Combat Desertification in 2003. As a party to the CBD, Bhutan has produced four Biodiversity Action Plans – one in 1998, the second in 2020, the third in 2009, and the fourth in 2014. Bhutan became party to several UN environmental conventions including the International Plant Protection Convention in 1994, the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal in 2002, the Convention on International Trade in Endangered Species of Wild Fauna and Flora in 2002, the Vienna Convention for the Protection of Ozone Layer and the Convention's supplementary agreement, the Montreal Protocol on Substances that Deplete the Ozone Layer, in 2004. Overall, these multilateral environmental agreements helped the government to develop and strengthen national policies that pursue sustainable development.

5. SCP Status and Trends in Bhutan

In Bhutan, most international agencies work directly with the Royal Government of Bhutan (RGoB), along the Five-Year Plan activities that align with the donor agencies' focus areas. The EU provides funds in the form of direct budgetary support to the government, while the EuropeAid SWITCH-Asia Programme provides funds through the not-for-profit track, such as academic institutions and international and national NGOs, and they work in mutually agreed and targeted areas at all levels -- from the grassroots to policy interventions. SWITCH Asia, under the Regional Policy Support Component, implemented Green Public Procurement (GPP), sustainable tourism, and efficient industrial development in Bhutan. Within the period of support, an analytical study applying the SCP-HAT Tool was carried out to measure the performance of the country against targeted indicators. While the report [NEC, 2016a] states that Bhutan's existing laws and regulations promote or support SCP directly or indirectly, the study's output results indicated that the country is inefficient in material use, with an average rate of extraction of 12.7 tonnes per capita, which is three time higher than the regional average of 4.6 tonnes per capita. Over the 1996 – 2015 period, air pollution at the household level increased by 23%; and GHG emission increased to 2.6 million tonnes from 1.3 million tonnes, mainly from construction, mining and manufacturing industries. It also showed that about 90% of the land footprint is contributed by the domestic market and 10% percent is from imported goods. The National Environment Commission (NEC) published a few reports dedicated solely to the SCP status and trends in Bhutan. One of the common recommendations from the reports was to develop a National SCP Strategy, with specific targets and effective implementation plans for each sector, to address the current challenges faced with regard to SCP practices.

The government reported to the United Nations High-Level Political Forum in July 2021, through its Second Voluntary National Review (VNR), the status of development of the National Sustainable Consumption and Production Strategy and Action Plan–2030, and that once it was endorsed, it would ensure that scientific methodologies and tools are used to support the design and implementation of strategic SCP policies and instruments in the identified areas of intervention. It also highlighted that to ensure successful implementation of policy instruments, access to expert networks and existing solutions was critical, alongside opportunities for learning and replicating best practices as appropriate to the national context.

Bhutan did put policy instruments in place to encourage the practice of SCP, for instance, integrating SCP learning in vocational education and initiating paperless office operations in the public sector. In order to discourage fossil-fuel-based transport, the government has imposed a 5% green tax on fossil fuel and on import of fossil-fuel-based vehicles. The 11th Five Year Plan sought to achieve "self-reliance and inclusive green socio-economic development". In the same vein, the latest Economy Development Policy 2016 aims to incorporate various sustainable aspects in Bhutan's economic growth by prioritising energy efficiency, better building and product standards, and local production and consumption. Electricity in Bhutan is generated entirely from hydro power, a green source, most of it being produced by run-of-the-river that has less impact on ecosystems and local human communities than from water stored in reservoirs. Other sustainability initiatives in practice include a nation-wide ban on plastic bags; paperless operation guidelines; heavy restrictions on private logging; maintaining 50% of the land cover as protected areas and habitat corridors; decentralising control over natural resources to local communities; promoting good governance; and providing more effective resource management.

6. Interactions between Sustainable Development Goal 12 and other SDGs and GNH domains

SDG 12 aims at decoupling economic growth from environmental damage and natural resource exploitation. The eight substantive targets of SDG 12 and their ten corresponding indicators cover issues that relate to lifestyles and behaviour generally, and chemicals and waste specifically. These includes targets on promoting universal understanding of a sustainable lifestyle (target 12.8); promoting sustainable public procurement practices (target 12.7); encouraging companies to adopt sustainable practices and sustainable reporting (target 12.6); substantially reducing waste generation (target 12.5); responsible management of chemicals and wastes, and significantly reducing their release to air, water and soil (target 12.4); and halving global per capita food waste (target 12.3). All these targets aim to achieve sustainable management and efficient use of natural resources by 2030 (target 12.2).

Three targets of SDG 12 focus on supporting developing countries' scientific and technological capacity for SCP (target 12a), developing and implementing tools to monitor sustainable tourism (target 12b), and removing market distortions that encourage wasteful consumption (target 12c). Beyond this, an important means of implementation is encouraging the general public to become more knowledgeable about the effects of their material consumption, as much can also be achieved by changing personal attitudes towards material use and waste generation.

Because it focuses on the environmental impacts of economic activities, many interlinkages exist between SDG 12 and other goals and targets. In the context to Bhutan's priorities, SDG 12 shows important influences on targets of SDGs 2 (sustainable food production), 3 (good health and wellbeing), 4 (quality education), 6 (clean water and sanitation), 7 (clean energy), 8 (resource efficiency), 9 (resource-use efficiency), 11 (sustainable city) and 15 (life on land) where progress in one indicator is associated with the fulfilment of another one in the same goal. The possible interlinkages between SDG 12 and other SDGs and GNH domains is illustrated in the **Table 1**.

Sustainable management of natural resources (target 12.2), including resource-use efficiency of water, energy and material flows (targets 6.4, 7.2 and 11b), would improve water quality (target 6.3), promote the use of renewable energy (target 7.3), encourage waste minimisation through 3Rs (target 12.5), and promote sustainable use of ecosystems (target 15.1). The food waste and loss reduction (target 12.3) and the aim to manage chemicals more judiciously (12.4) directly support target 2.4 in terms of increased food production and nutritional outcomes. Food waste, from farm to fork and post-consumer, needs to be cut drastically. Redistribution of edible food (target 2.4) from supermarkets, restaurants and homes is an obvious first step. Waste from the manufacture of food products can be fed to animals, and inedible remains converted into biogas and clean renewable energy (target 7.2). Improved energy efficiency (target 7.3) delivers more food with less and clean energy, and reduces impacts on climate (target 13.1) while ensuring food security (target 2.3).

Waste reduction and prevention of plastic and hazardous chemical waste (target 12.4) will reduce contamination of terrestrial ecosystems and animal habits (targets 15.1 and 15.5), which currently affects productivity of soils (target 2.4) with impact on human health (target 3.9). Bhutan's annual economic growth is largely driven by government budget spending, therefore adopting more sustainable public procurement practices (target 12.7) would create economies of scale for greener products and services that could help deliver target 12.4 on the responsible management of chemicals and waste, and target 12.5 on substantially reducing waste generation—which are priority objectives.

The introduction of a circular economy (target 12.5) would stimulate and increase resource productivity (target 8.4) and accelerate the shift away from fossil fuels to renewable energy. It would also create new jobs (target 8.5) and business opportunities, thus reducing poverty and inequalities (target 10.3). This would help achieve sustainable urbanisation, sustainable transportation (targets 11.2 and 11.3), and sustainable and resilient infrastructure (target 9.4), thus contributing to sustainable use of terrestrial ecosystems (target 15.1). Economic growth enables the population to acquire advanced technology (target 8.2) and to have greater access to better education (target 4.7). Quality education (target 4.7) is crucial to changing people's mindsets regarding the relationship between nature and economic growth, and will lead to behaviour change among both consumers and producers, which in turn would lead the latter to promote more sustainable, resource efficient and less wasteful industrial production (target 9.2).

Implementing nature-based sustainable tourism (target 12b) initiatives increases resource-efficiency, decoupling tourism growth from the use of finite resource and stimulates an inclusive economic growth, creates jobs and enhances the livelihood of local community (target 15c) to help reduce poverty (target 1.2), protect the local cultural heritage (target 11.4) and preserve terrestrial ecosystem and biodiversity (target 15.4), harvesting mutually beneficial relationship between preservation and tourism revenue, and ultimately contributing to the necessary transition of society towards greater sustainability.

Table 1. Possible interlinkages between SDG 12, other SDGs and GNH domains

	SCP 12 Targets	Related SDG Targets	SDG	GNH domains
12.2	By 2030, achieve sustainable management and efficient use of natural resources	• 6.4: Water use efficiency • 7.2: increase the share of renewable energy in the global energy mix • 7.3: improvement in energy efficiency • 15.1: sustainable use of terrestrial and inland freshwater ecosystems and their services	6 7 15	• 4: Ecological diversification and resilience • 9: Good governance
12.3	By 2030, halve per capita global food waste at the retail and consumer levels, and reduce food losses along production and supply chains including post-harvest losses	• 2.4: ensure sustainable food production system and implement resilient agricultural practices	2	• 4: Ecological diversification and resilience
12.4	By 2020, achieve environmentally sound management of chemicals and all wastes throughout their life cycle in accordance with agreed international frameworks and significantly reduce their release to air, water and soil to minimize their adverse impacts on human health and the environment	• 3.9: reduce deaths from air, water, soil pollution • 6.3: improve water quality by reducing pollutants • 13.1: strengthen resilience and adaptive capacity to climate-related hazards • 15.1: sustainable use of terrestrial and inland freshwater ecosystems and their services • 15.5: reduce the degradation of natural habitats, prevent extinction of threatened species	3 6 13 15	• 4: Ecological diversification and resilience • 3: Health
12.5	By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	• 8.4: improve global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation • 9.4: upgrade infrastructure and resource-use efficiency, and adopt clean and environmentally sound technologies	8 9	• 4: Ecological diversification and resilience • 1: Living standard
12.6	Encourage companies, especially large and trans-national companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle		8 9	• 4: Ecological diversification and resilience
12.7	Promote public procurement practices that are sustainable in accordance with national policies and priorities	• 12.4: environmentally sound management of all wastes • 12.5: reduce waste generation	12	• 9: Good governance
12.8	By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature	• 4.7: ensure education for sustainability for all learners, so that they acquire the required knowledge and skills for values-oriented action	4	• 2: Education • 6: Community vitality
12b	Develop and implement tools to monitor sustainable development impacts for sustainable tourism which creates jobs, promotes local culture and products	• 1.2: reduce poverty in all dimensions • 8.9: implement policies to promote sustainability • 11.4: protect world's cultural and natural heritage • 15c: increase the capacity of the local communities to pursue sustainable livelihood opportunities	1 8 11 15	• 1: Living standard • 6: Community vitality • 9: Good governance

7. Sector-specific analysis of SCP status

Bhutan's Second Voluntary National Review Report on the Implementation of the 2030 Agenda for Sustainable Development (2021) indicated development of a National Sustainable Consumption and Production Strategy and Action Plan–2030 as one of the major steps taken towards advancing efforts to implement SCP patterns within Bhutanese society. It was built on the SCP Hotspot Analysis results and led to the identification of seven priority sectors: energy, agriculture, construction industry, waste management, tourism, transport and education, which also align well with Table 1.

In the following sections, the sectors (except for education) will be portrayed in more detail, followed in the next section (8.) by a gap analysis and recommendations.

7.1 Energy

Bhutan has been a power surplus country, and the export of electricity has been a main driver of the economy, contributing 17.74% of GDP in 2020 (NSB, 2021). The per capita energy consumption for 2020 was 2,708.34 kWh, a slight decrease from the previous year. The electricity generation is entirely from hydro, a green source, and most of it is produced by run-of-the-river that has a lower impact on ecosystems and local human communities than conventional hydropower generation. A number of improvements have been made in the country to intensify investments in renewables beyond the standard hydropower projects. In 2018, Bhutan offset roughly 4.4 million tonnes of CO_2e (carbon dioxide equivalent) through export of hydroelectricity and is projected to offset annually about 22.4 million tonnes of CO_2e by 2025[1] through export of clean energy. In an effort to further spread the use of renewable energy and to decrease the country's carbon emissions, Bhutan has also provided 100 kWh free electricity every month to rural farmers. This has reduced the amount of firewood and gas they use for farm work. The government also subsidises the supply of LED light bulbs and electric vehicles.

However, rapid economic development and improved living standards lead to increased energy demand for productive activities and public services. Energy consumption at the household as well as industry levels is on the rise (GNHC, 2021). This increase in energy demand has also posed challenges and threats to energy security and raised environmental concerns. Of the total electricity generated, households consume 25.5%. The domestic energy demand has been increasing at an average of about 4% over the previous year (BPC, 2020), If Bhutan can save at least 1% of energy through use of energy efficient appliances, it will earn additional revenue of Nu. 4.6 million every year through export of electricity.

For energy use, Bhutan relies on multiple sources including hydropower, biomass, and fossil fuel. Bhutan has no petroleum or natural gas reserves. For domestic consumption, fossil fuels such as diesel, petrol and LPG are all imported from India. Based on the *Annual Environment Accounts Statistics* (NSB 2021)[2], Bhutan imported about 370.208 kL per day of oil in 2020. Most oil imports are used as fuel for automobiles. As regards consumption, the service sector consumed the maximum fuel (33%), followed by the agricultural sector (22%), industrial sector (20%), and the household sector (19%). The most effective approach to reduce GHG emissions is to decarbonise the energy system through investment into renewable energy, including solar and wind. A solar and wind energy project was initiated in Wangdue Phodrang in 2015, and more such projects are planned in the 12th Five Year Plan. The Alternative Renewable Energy Policy 2013 provides the policy framework to address key issues relating to the promotion of renewable energy. The Sustainable Hydropower Development Policy 2021 **Clause 11 requires the preparation of a Green Hydrogen Roadmap for development of a hydrogen economy (hydrogen fuel, green ammonia, energy storage), adopting suitable technologies to substitute fossil fuels** to mitigate global warming and climate change. All these actions support achieving SDG 7.2 in increasing the renewable energy ratio of the global energy bank.

The National Energy Efficiency & Conservation Policy 2019, published by the Department of Renewable Energy , is aligned to reducing energy intensity (promoting energy savings) addressing the energy demand-side management. It focuses on the huge potential that exists in energy intensive sectors such as building

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1   Bhutan Policy Environment Paper, Wuppertal Institute, Berlin 2018 – published as part of Urban Pathways project and future Radar project funded by EU's H2020 (p.10).
2   NSB's Annual Environmental Accounts Statistics, present green economy indictors..

and construction, appliances, industry and transport sectors. The policy also aligns well with target 7.3 of the SDGs to improve the efficiency of energy use to decrease the climate impact of energy provision. Steps have been initiated by the government to reduce energy intensity and decouple economic growth from consumption of energy resources, as shown in **Table 2.** Furthermore, there has been a continuous push by the government to move towards an electric-powered transport sector, including levying a 5% green tax on fossil fuels and also on the import of fossil-fuel-based vehicles.

The Ministry of Works & Human Settlement published the National Housing Policy 2020 setting direction not only to preserve and promote traditions, culture and local ecosystems, but also to promote green and energy efficient housing by encouraging the use of locally available construction materials in the construction of affordable housing for all.

Table 2 Bhutan's Energy Sector: Current Status and Development Plans		
Sector	**Current Status**	**Development Objectives**
ENERGY (SDG 7, SDG 13)	A rapid growth of economic development and improved living standards lead to increased energy demand for productive activities, public services as well as for household use. Energy consumption at the household and industry levels are on the rise, as reported in Bhutan's second voluntary national review report 2021 [*Bhutan's Second Voluntary National Review Report, 2021, p. 91]*. This increase in energy demand poses challenges and threats to energy security and raises environmental concerns.	As climate change mitigation measures, the government has future plans: **1) To strengthen energy efficiency** Sectors under consideration are building, appliances, industry and transport. • Modernisation of existing buildings and promoting/ mandating energy efficient design for new building construction • Promoting more energy efficient products including consumer access to energy efficient appliances as well improving the public procurement system. • Energy efficiency upgradation measures shall be promoted in industrial processes through retrofitting, refurbishment, technology transfer and/or process modifications as well as by implementing Energy Audit • Promotion of energy efficient transportation shall include public transportation, electric and hybrid vehicles, and non-motorised transportation like walking and cycling. (*National Energy Efficiency and Conservation Policy 2019*) **2) To reduce energy consumption from fossil fuels ▯ Develop the renewable energy sector** • Diversify renewable energy sector: With rising demand for electricity and Bhutan's reliance on hydropower generation, the Department of Renewable Energy aims to broaden the energy supply mix by exploring other forms and sources of clean and renewable energy. This will supplement hydropower generation, which is vulnerable to climate change impacts, and will address the electricity shortage regularly faced during the dry season. Bhutan's Alternative Renewable Energy Policy 2013 aims to promote alternative sources including solar power plants (photovoltaic and thermal), small-scale hydropower geothermal plants, wind turbines and windmills, biomass and biogas plants. • Ensure energy access for remote communities. A key ongoing action is to develop Decentralised Distributed Generation (DDG) projects for provision of energy-based services to remote and dispersed villages, which are not electrified or not connected to the grid, through solar thermal, solar photovoltaic and other stand-alone systems. (*National Environment Strategy 2020, p, 69-70*)

1.1

7.2 Agriculture

Bhutan initiated actions towards achieving food self-sufficiency in1982, and has made significant achievements since then. Currently, domestic production in cereal crops meets 66%, vegetables 95%, and eggs 100% of the nation's requirement. Despite every effort to improve food self-sufficiency and livelihoods of the rural communities, the country still faces a constant challenge to retain productive land and fight against climate-induced disasters. The Labour Force Survey 2020 showed that in Bhutan the highest employment is in the agriculture sector (49.9%), and the lowest is in the industry sector (13.5%). The share of employment in the service sector stands at 36.6% (NSB, 2020) [3]. Poverty in rural areas is 11.9%, which is higher than in urban areas at 0.8%. The gradual increase in population size (population growth rate is1.3% per annum), led to an increase in population density from 17 persons per km^2 in 2005 to 19 persons per km^2 in 2017. In addition, the steady GDP growth, and a literacy rate of 71.4% [NSB 2021], all put pressure on the limited agricultural land.

As reported in the 2nd VNR, Bhutan has high water availability but low accessibility due to insufficient source management, inadequate infrastructure development and maintenance, and issues in governance and sector-based systems. Rapid urbanisation is also increasing pressure on water infrastructures, with inadequate capacity of local governments to maintain the facilities. Water shortage is particularly predominant in the winter season and on the higher elevations. Many irrigated fields temporarily lack water supply from the local sources on the hill slopes, even as a large volume of water runs down the streams at some distance. To conserve and manage the water sources in an economically efficient, socially equitable and environmentally sustainable manner, the National Integrated Water Resources Management Plan 2016 provides a legal framework to manage water resources with an integrated approach, establishing river basin committees within the basin to enhance its economic value. Indicators for water security have been formulated, as also the means of coordinating agency plans. The Plan is well aligned to the indicators for SDG 6.4, which is to increase water-use efficiency and to ensure sustainable withdrawals of freshwater.

Currently, only 2.93% of the land is available for agricultural use (NSB, 2021). Arable land is limited because of the country's rugged terrain, land fragmentation and steep slopes of up to 50 degrees, which are unsuitable for cultivation. With increasing population and rapid socio-economic development, pressure on land is rising, leading to increasing conversion of forest land to other land uses, such as uncontrolled mining causing land disturbance and fissures. Between 2009 and 2015, 2,739 hectares of state land were leased to entrepreneurs and corporates for agriculture, mining and industrial development projects. On the other hand, huge areas of agricultural land are left fallow due to land degradation, low productivity, wildlife depredation and scarcity of water for irrigation.

In recent years, Bhutan has ventured into organic agriculture not only to commercialise so as to enhance production and improve livelihoods of rural populations, but also as a strategy to foster sustainable agriculture and improve soils conditions. With production of organic crops still growing, policy focus has been directed towards expanding the number of products and linking them to markets.

The National Waste Inventory Survey 2019 indicated that nearly half (46%) of the total waste produced come from food waste (NSB, 2019). The food is wasted along the supply chain – in production, distribution, transportation, storage and consumption. The inventory shows that about 78,988 kg of food is wasted per day resulting from consumption which occurs in homes, restaurants, hotels, bars, institutes, health centres, industry and at vegetable vendors' storage units (ibid.).

Currently, no data is available for Bhutan's losses at different stages of post-harvest handling operations. During the COVID-19 lockdowns, Bhutan faced a shortage of fresh local produce due to challenges in preservation and transportation. Cases were also reported of rural communities losing their crops to wild animals, which harmed their livelihoods. Bhutan needs to carry out a study on post-harvest losses of crops to determine how much food is lost before reaching the consumers and at which stages the major losses occur for specific food crops. Accurate data on post-harvest losses of crops at different stages of handling can be beneficial for policymakers and relevant organisations to make appropriate interventions to help reduce food losses. This would ensure that the food that has been produced after all the inputs reaches the market to feed the growing population. Better post-harvest storage would not only cut food loss but would also reduce economic losses, improve food safety, reduce market gluts, and allow a greater share of the harvest to meet food safety standards for export.

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3   - Labour Force Survey Report 2020, p.21

Food loss and waste has far-reaching effects from one end of the supply chain to the other. Farmers lose income on crops they cannot sell while consumers' expense on food increases, fuel is wasted transporting food that spoils as it travels, and retailers experience significant losses on unsold items. Environmentally, food loss and waste inflict a host of impacts, including unnecessary greenhouse gas emissions and inefficiently used water and land, which in turn can lead to diminished natural ecosystems and the services they provide.

Reducing food loss and waste is critical to creating Zero Hunger conditions and meeting the SDGs, especially SDGs 2 and 12. Researchers, educators and policymakers must look at not just increasing food production, but also at how to steer systems towards reducing unnecessary food wastage in the food system as a way to improve and enhance knowledge and structures for reducing food waste, and take a scientific approach of a life-cycle analysis perspective on the food industry. Increasing the quality and quantity of local produce and linking farmers to schools would result in the added benefit of improving dietary diversity and children's access to healthy food. This is especially important as Bhutanese schoolchildren consume significant amounts of junk food.

To safeguard limited land resources (which are very vital for the production of food) by avoiding, reducing, and reversing land degradation, and to play a pivotal role in achieving soil security, food and nutrition security, and water security, the government has designed and mainstreamed sustainable land management programmes in all dzongkhags on priority, and necessary indicators for water security have been formulated to achieve the objectives listed in **Table 3.**

Table 3 Bhutan's Agricultural Sector: Current Status and Development Plans		
Sector	**Current Status**	**Development Objectives**
Water (SDG 2, SDG 6, SDG 13)	As reported in the 2nd VNR, high water availability but low accessibility due to insufficient source management, inadequate infrastructure development and maintenance, and issues in governance and sector-based system [*Bhutan's Second Voluntary National Review Report (2021), p. 30*] Water shortage is particularly predominant in the winter season and at higher elevations. Residents have limited access to water although the river is flowing past in their vicinity. Likewise, many irrigated fields temporarily lack water supply from local sources on the hill slope while a large volume of water runs down the stream at some distance.	1) **Increased agricultural water utilisation/ efficiency and increased contribution to GDP** • Increase coverage of irrigation • Reduce water losses in agriculture and irrigation • Adopt climate smart and efficient water conveyance and management technology 2) **Water resources protected, and sustainably utilised or managed** • Reduce water demand (increase water-use efficiency, water-efficient crops) • Formulate and update implementation of comprehensive river basin management plans [*National Integrated Water Resources Management Plan (2016), p. 76-80*]

Land (SDG 6, SDG 11, SDG 15)	Good land is limited because of rugged terrain, land fragmentation and steep slopes up to 50 degree, which are unsuitable for cultivation. Currently, only 2.93% t of arable land is under cultivation. With increasing population and rapid socio-economic development, pressure on natural environment is rising, increasing conversion of forest land to other land usage, uncontrolled mining causing land disturbance and fissures. On the other hand, huge areas of agricultural land are left fallow due to land degradation, low soil productivity, wildlife depredation and scarcity of water for irrigation. [*Agriculture Land Development Guidelines (2017), p. 9*]	1) **Plan for balanced land use** • Strengthen environmental impact assessment for land use change and new development enforcing Environmental Assessment Act 2000 and Regulation for Environmental Clearance of Projects 2016 • Establish land use and governance system to enable establishment of a harmonised national land use for integrated socio-economic development (assess the present and future needs of land by evaluating its capability to meet the competing demand for its uses; provide scientific basis for good land governance) • Ensure optimum utilisation of arable land based on analysis of needs and suitability (undertake land reclamation resilience against climate change impacts) [*National Environment Strategy (2020), p, 33*]
Food Waste (SDG 2)	National Waste Inventory Survey 2019 indicated that nearly half (46%) of the total waste produced comes from food waste. The food is wasted along the supply chain – in production, distribution, transportation, storage and consumption. The inventory shows that about 78,988 kg of food is wasted per day resulting from consumption in homes, restaurants, hotels, bars, institutes, health centres, industry and at vegetable vendors' storage units. [*National Waste Inventory Survey (2019)*] The National Waste Management Strategy 2019 and other policies adopted are also mainly targeted at reducing and managing solid waste generation but lack particular attention to managing of food waste.	Strategies published by the Ministry of Agriculture and Forest focus on the promotion of sustainable production of foods. The post-harvest programmes are implemented on an ad-hoc basis depending on the needs of farming.

7.3 Construction Industry

The construction industry is one of the important sectors that contributes to the economic development of the country. It transforms various resources into physical economic and social infrastructure necessary for socio-economic development. It encompasses the processes in which the said physical infrastructure is planned, designed, procured, constructed or produced, altered, repaired and maintained. The construction industry contributed 9.5% share to GDP in 2020 (NSB, 2021), despite the business shutdown caused by the COVID-19 pandemic. The government allocates a significant percentage of the annual development budget to expand and deliver high quality and safe infrastructure facilities to rural and urban communities. It has, however, failed in its mandate in many projects due to a lack of competence of the local construction industry and partly due to flaws in the provisions of the procurement regulation (going for lowest quotes). Since the country's annual economic growth is largely driven by government budget spending, adopting more sustainable public procurement practices on priority would create economies of scale for greener products and services that could help deliver target 12.4 on the responsible management of chemicals and waste, and target 12.5 on substantially reducing waste generation. Construction materials like bricks and hollow blocks produced locally are more environment friendly compared to the imported mud/clay bricks. The process of making mud/clay bricks involves emission of GHGs during the firing and cooling stages, as well as the production of ash and soil waste. However, preference is always given to imported products. As supply selection is governed by price quotation, lower prices of imported goods and services have an advantage over local production.

According to the Schandl et al. (2016), Bhutan's domestic material consumption grew by 50% since 1990, which ultimately returns to the local environment as waste. While the formal waste management sector also provides employment, a section of the urban population makes their living from recovering recyclable materials from waste, The construction industry acts as the center of the circular economy chain. Recognising this fact, bringing sustainable growth to this sector through improved efficiency will significantly reduce the material and carbon footprint in the overall economy. Thus, an action plan towards greening the supply chain through increasing resource efficiency, adopting clean technologies, and promoting value addition and environmental compliance is necessary.

7.4 Waste management

The Royal Government of Bhutan intends to promote environmentally sound waste management practices. The Waste Prevention and Management Act of Bhutan adopted in 2009 aims to promote the Reduce, Reuse and Recycle (3Rs) approach and improve final disposal sites as highlighted in **Table 4.** The overall aim of the Waste Management Strategy 2019 is to prevent and minimise the generation of waste at source, and to divert materials to be reused, recovered and recycled, in order to minimise the amount of waste going to landfills, following the principles of circular economy, and to achieve "Zero Waste Bhutan by 2030".

The government conducted the National Waste Inventory Survey in 2019 which showed that the country generates a total of 172,161.09 kg of solid waste per day but the construction waste was not part of the scope of the survey. However, in the present context, solid waste and effluents are considered to be major environmental concerns in Bhutan in the face of weak institutional coordination, chronic under-resourcing and rapid urbanisation. Rapid development of the construction industry will further increase construction waste leading to shorter life span of landfills where the waste will be dumped. Waste reduction through the practice of 3Rs in the construction industry, though still in its infancy, is one way towards sustainable waste management.

Solid waste reduction through 3Rs is one of the thrusts of the National Solid Waste Management (NSWM) Policy. The constraints to 3R practice in construction waste management are many, mainly related to profit, time and cost. Most contractors only focus on short-term economic benefits and are unwilling to spend on construction waste management. On-site waste segregation requires substantial labour input, which would increase the cost of the construction project. Lack of public participation is another issue in construction waste management. Several reports have highlighted the disconnect in Bhutanese society between environmentally friendly attitudes and actual behaviour. The practice of illegal open dumping of waste (littering at small and large scale) indicates a lack of civic sense in personal behaviour despite the country's traditionally eco-friendly ethos [NEC, 2016, p.43]. There is a lack of effort to enlighten and train the construction workforce to enable them to improve waste minimisation practices at construction sites. Awareness should be addressed at the grassroots level. Low awareness and concern among the public are among the causes for limited recycling implementation. Public will participate and practice 3R only when there are policy and political drives.

Table 4
Bhutan's waste management: Current Status and Development Plans

Sector	Current Status	Development Objectives
Soild Waste (SDG 6, SDG 11)	The rapid pace of socio-economic development has posed emerging challenges in fulfilling the constitutional mandate to 'secure ecologically balanced sustainable development, while promoting justifiable economic and social development'. Effective waste management is identified as a major emerging issue threatening both public health and pristine environment. [*12th Five Year Plan 2018-23; Volume-II: Central Plans, p.409*]	The overall aim of the waste management strategy 2019 is to: 1) **Explore and adopt appropriate technologies that are locally appropriate** • Explore technologies for waste collection, storage, transfer and treatment (3R and sound waste management) • Explore technologies for waste recovery (material recovery) • Explore and promote research on indigenous and endogenous waste management practices (improve waste management services, waste management information system) • Set up waste collection and treatment facilities as needed (good practices, benchmarking) 2) **Establish community and school waste bank** • Set up waste separation and waste banks at schools and communities (recycling process, waste separation , cleaning campaign) • Establish functional recycling programmes for the waste banks with proper modus operandi (payment model for services, stimulate waste collection and anti-littering) • Connect waste banks with waste generating facilities and market (waste management network, economic value of the waste) 3) **Behavioural change through education and awareness programmes** • Innovative waste management education programmes for schools • For tertiary education system, focus on practical demonstration projects to gain deeper understanding especially on technological options for waste disposal. This includes hands-on training on compositing, waste separation, value addition, activities on selection of options that are less wasteful, waste-to-energy initiatives etc. • Improve delivery of public waste management awareness by engaging religious personalities and social media [*National Waste Management Strategy, (2019), p. 31-34*]

Green Procurement (SDG 8, SDG 9)	The annual financial statement for the year ending 30 June 2021 indicated that government and state-owned enterprises together spent approximately Nu. 64,615 million on procurement, which accounts about 17.2% of GDP [*Annual Financial Statements of the Royal Government of Bhutan for the year ending 30th June 2021*]	• Fiscal Incentives Act of Bhutan 2021 • The 2012 Sales Tax, Customs and Excise Act introduced a new tax head called the "Green Tax" • The Public Procurement Regulation 2021 through Clause 62, "goods of Bhutanese origin may be given preferential treatment" favours locally produced products • Cottage and Small Industry (CSI) Policy 2019 clearly promotes SCP through clause 6.3.9: "provide preferential procurement for locally produced CSI products while ensuring the specifications and qualities are equally competitive with other products and services in the market". It ensures that public procurement favours locally produced products and services. Priority is also given to sustainable, green and services industries and clause 6.6.5: "Strategically position goods and services produced by CSIs in high value market niches using Bhutan's Seals of Excellence and Quality, the Seal of Origin, Bhutan Organic Logo and Green Labelling" • The Consumer Protection Rules and Regulations 2015 require product labelling for "all products which are manufactured for sale or offered for sale in Bhutan, or imported for sale in Bhutan shall be labelled as per the standards on labelling prescribed by relevant agencies of the government or as per the international standards"

7.5 Tourism

The tourism industry is recognised as a major source of foreign exchange earnings in Bhutan, and it is in the interest of the government to accelerate the development of sustainable tourism through balanced regional development. Since the beginning, the government was aware that an unrestricted flow of tourists could negatively impact Bhutan's pristine environment and unique culture. Therefore, it adopted the policy of "high-value, low-volume" tourism in order to control the type and quantity of tourism right from the start, and introduced the Sustainable Development Fund, with a fee levied on tourists, to compensate for the negative environmental impacts associated with tourism. It has undoubtedly contributed to the unique tourism brand of Bhutan. The number of non-South-Asian tourist arrivals increased from just 287 in 1974 to 72,199 in 2019. Additionally, 242,947 regional tourists from Bangladesh, India and Maldives visited in the year 2019, highlighting the importance of the regional market. In 2019 (pre-COVID-19 pandemic), Bhutan recorded 315,599 visitors, which is an increase of 15% over 2018.

Tourism has helped promote Bhutan's culture and traditions in the outside world, and interactions with tourists have contributed to a sense of national identity while at the same time further enhancing the need to conserve the country's natural and cultural assets as its most significant attraction. The Tourism Council of Bhutan worked closely with the Handicrafts Association of Bhutan to support artisans in generating revenue and income from tourism activities. Luxury hotels provide high-quality accommodation and services while developing products that capitalise on the growing popularity of spiritual and wellness travel, such as yoga retreats. A system of licensing all cultural and trekking guides was instituted by the Department of Tourism to ensure that guides are trained in the necessary trekking, mountaineering, environmental and cultural issues relevant to the country's tourism sector.

Bhutan's main tourist attractions are its traditional culture and way of life, its religious festivals, historic monuments and its pristine environment. While Bhutan has benefitted immensely from the growth in the tourism sector, the volume of tourist traffic also poses some challenges. The growth in the industry has been accompanied by social, cultural, and environmental issues [TCB, 2020], which are anticipated to grow in the future. Further, the shift and sophistication in the demand and behaviour of the tourists for meaningful travel experiences also necessitates the need for growth and diversification of tourism products and destinations, including authenticity, contact with local communities, and learning about culture, traditions, flora and fauna, etc. There is thus a clear need for a sustainable approach to tourism development.

Protecting nature and culture is a part of the Bhutanese value system and an important aspect of the traditional way of life. Bhutan's tourism policy reflects these concerns. In the 12th Five Year Plan, a budget layout of Nu.1.566 billion is provisioned for a flagship programme, the Sustainable Tourism Development Flagship Program, to develop sustainable tourism through diversification of products, services and amenities. The programme targets an increase in tourism gross receipts from Nu.10 billion to Nu.39 billion, and direct revenue contribution from Nu.1.6 billion to Nu.5.5 billion in the next five years. It also intends to create 15,000 additional jobs. The programme recognised that economic diversification in tourism is a key component of sustainable development as it assists the country in reducing poverty (target 1.1) and generates employment (target 8.5) in the long run. Bhutan's long-term strategy of controlled tourism with a focus on sustainability and quality has become vital to secure the country's reputation as an exclusive and distinctive destination for all time. Also, to overcome the industry's biggest challenges, tourism in Bhutan has diversified from mostly cultural tourists, sightseers and trekkers to special interests, such as sports and adventure tourism, ecotourism and nature-based tourism. Implementing nature-based sustainable tourism (target 12b) initiatives in a resource-efficient and low-carbon manner decouples tourism growth from the use of finite resource, and have the potential to advance SDGs 8,11 and 15.

Terrestrial ecosystems and biodiversity (target 15.4) are the prime tourism assets, and their preservation offers great opportunities for nature-based tourism (and ecotourism), with a mutually beneficial relationship between preservation and tourism revenue, which will ultimately contribute to the necessary transition of society towards greater sustainability. Sustainable tourism creates jobs and enhances livelihoods of the local communities (target 15c) to help reduce poverty (target 1.2), and protect the local cultural heritage (target 11.4). Tourism also contributes to the promotion of economy, trade and cultural links between developed and developing countries and regions, enhancing cooperation at all levels (target 17.16).

With ecotourism being the fastest growing market in the tourism industry in general, and with the strength of the country's natural assets, Bhutan has focused on strategies to promote and develop ecotourism and nature-based tourism, as they bring more benefits than harms to the environment, the economy and local communities. Truly sustainable and responsible tourism will make destinations better for people to live in as well as to visit (**Table 5**).

Table 5
Bhutan's Tourism Industry: Current Status and Development Plans

Sector	Current Status	Development Objectives
Sustainable Tourism (SDG 8, SDG 9, SDG 10, SDG 11)	The tourism industry is recognised as a major source of foreign exchange in the country and it is in the interest of the government to accelerate the development of sustainable tourism through balanced regional development. In 2019 (pre-COVID-19 pandemic) Bhutan recorded a total of 315,599 visitors, an increase of 15% t over 2018. In the 12th Five Year Plan, a budget layout of Nu.1.566 billion is provisioned for a flagship programme to develop sustainable tourism through diversification of products, services and amenities. The programme's target is to increase tourism gross receipts from Nu.10 billion to Nu.39 billion and direct revenue contribution from Nu.1.6 billion to Nu.5.5 billion in the next five years, and to create 15,000 additional jobs. *[12th Five Year Plan 2018-23; Volume-1: Main Document, p, 42]*	Bhutan's vision of Sustainable Tourism: Promote High Value, Low Volume tourism. 1) **Promote sustainable tourism that creates jobs and promotes local culture and products** • Open new areas and sites for tourism only upon taking into consideration the impacts on ecology, values, significance to and sentiments of the local communities and sites (regional balanced development) • Diversify tourism products with special emphasis on unique offerings and comparative advantage taking into consideration needs for geographical spread and year-round tourism (community-based tourism / village tourism / rural tourism / agro-tourism / ecotourism / wellness, spiritual tourism) • Promote domestic tourism by developing products and services catering to the needs of the resident tourists (enhance rural livelihoods) • Compensate for the economic opportunities foregone by communities living in places which are protected and conserved for purposes such as ecotourism by prohibiting development activities (responsible tourism, social responsibility, enhance rural livelihoods) [Tourism Policy of the Kingdom of Bhutan, 2020] 2) **Recognise the importance of long-term sustainability of the tourism industry to significantly cut carbon emissions and reduce material footprint** • Establish baseline of the waste (commercial, food, water, energy) generated by the hospitality industry; analyse the economic losses and carbon emissions caused by the waste; and the monitoring tools • Enhance green components in hotel standardisation and classification system (green hotel certification) [National SCP Strategy & Action Plan – 2030 (Draft)]

7.6 Transportation

As of December 2020, the total number of registered motor vehicles in Bhutan was 112,058. With the current population of 727,145, this number translates to 154 motor vehicles per 1,000 people. However, the vehicles are not evenly distributed across all regions of the country but are concentrated mainly in Thimphu and Phuentsholing regions as shown in **Table 6**.

Table 6 Distribution of Vehicles across Bhutan	
Region *(Source: RSTA)*	**Percentage**
Thimphu Region	53
Phuentsholing Region	33
Gelephu Region	7
Samdrupjongkha Region	5
Monggar Region	2

One of the primary concerns for Bhutan is the dominance of private commuter vehicles in its transportation system. The light-vehicle segment currently accounts for approximately 65% of the total registered vehicles, while heavy and medium buses together constitute less than 1%, highlighting the need and opportunity to strengthen the public transportation system in the country.

Road transport is the dominant form of domestic transport. The transport sector in Bhutan has been identified as the primary source of GHG emissions (and fossil fuel consumption) and is responsible for more than 400,000 tonnes CO_2e emission or 11.14% of the total GHG emissions (3,814,000 tonnes) in 2015. Within the energy group, transport activities were responsible for more than 60% emissions. This is likely to increase to 1.25 million tonnes CO_2e by 2050 under a business-as-usual scenario, with a significant rise in GHG emissions expected from light vehicles (3.8 times), followed by medium trucks (3.6 times) and heavy trucks (3 times) [MOIC,2021]. Hence, as a suitable strategy to control emissions, the government introduced the Low Emission Development Strategy for Surface Transport 2021 as a high-level, comprehensive and long-term strategy, which aims at decoupling socio-economic development from GHG emissions growth. The National Energy Efficiency & Conservation (EE&C) Policy addresses the energy demand-side management focusing on energy intensive sectors. The policy aims to create an enabling environment for energy efficiency and conservation measures in buildings, appliances, industry and transport sectors.

Fossil fuels import is increasing in Bhutan because of the rising number of fuel-based vehicles. In a business-as-usual scenario, it is expected that this trend will continue and will pose a significant threat to the environment and the country's economy. Increasing global fuel prices along with the increasing fuel demand would inflict a huge pressure on the country's balance of trade by widening its trade deficit. Thus, appropriate and timely measures are required to control the growth of private vehicles and to replace the existing conventional vehicles with cleaner technologies, mainly electric vehicles.

Table 7
Bhutan's Transport Sector: Current Status and Development Plans

Sector	Current Status	Development Objectives
Transport (SDG 3, SDG 7, SDG 8, SDG 13)	The transport sector in Bhutan has been identified as the primary source of GHG emissions and is responsible for approximately 424,830 tonnes of CO_2e emission or 11.14 % of the total GHG emissions (3,814,000 tonnes) in 2015. Within the energy group, transport activities were responsible for more than 60% emissions. This is likely to increase to 1.25 million tonnes CO_2e by 2050 under a business-as-usual scenario, with a significant rise in GHG emissions expected from light vehicles (3.8 times), followed by medium trucks (3.6 times) and heavy trucks (3 times). Hence, the need to draw a suitable strategy to control emissions has been recognised globally to address the global rise in temperature. *[Low Emission Development Strategy for Surface Transport 2021]*	1) **National Environment Strategy for Sustainable Development (2015)** for mainstreaming and implementation of environmental management needs to • Improve urban public transport systems in terms of area coverage and services • Introduce electric passenger bus services in urban centres, and promote electric cabs and passenger cars, together with development of supporting infrastructure 2) **National Strategy and Action Plan for Low Carbon Development (2012)** to fulfil Bhutan's commitment of remaining carbon neutral • Estimates of energy consumption, carbon emissions and reduction by transport sector by 2040 3) **Bhutan Transport 2040: Integrated Strategic Vision (2011)** establishes building blocks for • Passenger transport enhancement of public transport services and taxi services for intercity travel; mini-bus service for low demand areas and terminal facility at larger urban centres 4) **National Energy Efficiency & Conservation Policy of Bhutan (Nov 2019)** focuses on energy demand-side management especially in energy intensive sectors. • The government shall adopt appropriate measures to promote the uptake of fuel efficient and low emission vehicles based on the proposals submitted by the Nodal Agency

8. Gaps, Challenges and Recommendations

Bhutan's vision, policies, and plans are conducive to SCP. The pursuit of the GNH philosophy and the hope to remain carbon neutral are resonant with the SDGs and the climate goal to keep the global temperature rise below 1.5°C, which inevitably requires net zero carbon emission. Despite the favourable context, most sectors in Bhutan encounter difficulties in implementing sustainable consumption and production practices and habits due to a lack of knowledge, capacity and also poor enforcement of existing laws, as illustrated below.

8.0 SCP and SDGs: Interaction and linkages

SDG 12 focuses on the environmental impacts of economic activities. Many interlinkages exist between SDG 12 and other SDG goals and targets. The cause-and-effect relationship of these interlinkages shows synergy, and indicates a broad compatibility of indicators where the progress of one indicator is

associated with the fulfilment of another in the same goal. However, their interactions and linkages are complex and often overlapping, limiting complete understanding of their behaviour (chain reaction). A number of thematic issues have interlinkages with SCP, including climate action, sustainable transport, resource conservation and actions to combat plastics pollution. For example, the 2030 Agenda, together with the Paris Agreement, sets a range of universal transformative objectives for shifting all countries to a sustainable and low-carbon development path. The two agendas are deeply interdependent and reflect a strong potential for mutual benefits – both also have a shift to SCP embedded at their core.

Growing population and increasing urbanisation mean more people to feed and an increasing pressure on water and energy . While SDG 2 focuses more on food production and nutritional outcomes, SDG 12 focuses on the processing, distribution and procurement, which complements and completes the food system. Food waste, from farm to fork and post-consumer, accounts for about 50% of the total waste, and needs to be cut drastically. Redistribution of edible food from supermarkets, restaurants and homes is an obvious first step. Waste from the manufacture of food products can be fed to animals, and inedible remains converted into biogas and clean renewable energy.

Economic diversification is a key component of sustainable development as it assists in reducing poverty (target 1.1) and generates employment (target 8.5) in the long run. Economic growth also enables the population to have advanced technology (target 8.2) and to have greater access to better education (target 4.7). Remaining with the business-as-usual scenario will not sustain the planet earth. The introduction of a circular economy (target 12.5) would simulate and increase resource productivity (target 8.4) and accelerate the shift away from fossil fuels to renewable energy, creating new jobs (target 8.5) and business opportunities, thus reducing poverty and inequalities (target 10.3). This would help achieve sustainable urbanisation, sustainable transportation (targets 11.2 and 11.3) and sustainable and resilient infrastructure (target 9.4), which greatly contributes to sustainable use of terrestrial ecosystems (target 15.1).

Currently lacking in Bhutan is the understanding of the significance of life cycle thinking and a systems approach. Despite the favourable context set through policy and legal environment, most sectors encounter difficulties in implementing sustainable consumption and production practices and habits. The practice of illegal open dumping of waste indicates that the traditionally ecofriendly ethos of the country and incorporation of environmental studies in the education curriculum still have not solved the problem of the lack of civic sense in personal waste management. Modern urban lifestyle involves daily use of a large number of products but few people reflect on how these products have been produced and what environmental and socio-economic impacts have been caused along the way. In addition, few people think of what will happen to the products they are currently using when they don't need them anymore -- how they can be reused, recycled, or taken care of safely as waste.

8.1 Energy Efficiency and Conservation

To manage the demand for energy and reduce energy intensity (increase energy savings), the government is focusing on energy-intensive sectors like building, appliances, industry and transport, which have a huge potential to improve. It also aligns well with SDG 7.3, namely, to improve the efficiency of energy use so as to decrease climate impact of energy provision. Steps have been initiated by the government to reduce energy intensity and decouple economic growth from consumption of energy. Furthermore, the government has been constantly pushing to move towards an electric-powered transport sector, including levying a 5% green tax on fossil fuels and also on the import of fossil-fuel-based vehicles. However, there is limited direct private sector participation in this programme, and because of limited policy incentives, progress has been slow to show the required impact. The shortage of fuel supply and high fuel prices caused by the ongoing Russia-Ukraine conflict is a live example of the lack of a proactive policy to substitute fossil fuels with the abundant, locally produced hydroelectricity.

8.2 Agriculture

All strategies published by the Ministry of Agriculture and Forest seek to promote sustainable production of food, but the post-harvest programmes are implemented on an ad-hoc basis depending on the need of the farmers. The National Waste Inventory Survey 2019 indicated that nearly half (46%) of the total waste produced comes from food waste (NSB, 2019). The food is wasted along the supply chain – in production, distribution, transportation, storage and consumption. The inventory shows that on an average,78,988 kg

of food is wasted per day from consumption in homes, restaurants, hotels, bars, institutes, health centres, industry and from vegetable vendors' storage units.

Food waste is a huge problem in the country. There is urgent need to bring together knowledge about waste and energy systems, green consumption, food security, and practices for avoiding food waste. Sustainable waste management practices such as segregation at source for recycling would need an even more deeply embedded sense of responsibility, which is currently lacking. Further study needs to be conducted into food consumption practices. There is currently a net trade imbalance with regard to food, at least some of which could be due to the growing preference for international brands of packaged foods over local cuisine. At the macro level, the preference for rice as the key staple means a continued import dependence. Encouraging diet diversification away from rice and in favour of other types of local produce would have a positive impact on SCP. It will also have the added benefit for health of the population. The competition between local and imported foods is a challenge for achieving sustainable food consumption. The inorganic products produced and shipped into Bhutan from India over relatively long distances, still cost less (2 to 3 times cheaper) than the local produce in the market.

Energy and food systems are deeply entwined. About 30% of the world's energy is consumed within agri-food systems. Energy is also responsible for a third of agri-food systems' emissions of greenhouse gases. Both systems must be transformed to meet current and future demand for food and energy in a fair, environmentally sustainable and inclusive manner. A joint approach to the energy transition and to the transformation of agri-food systems is crucial to meet the SDGs and the Paris Agreement on Climate Change.

Solar irrigation is the most mature application widely adopted to improve access to water, enabling multiple cropping cycles and increasing resilience to changing rainfall patterns. The use of solar irrigation pumps has raised farmers' incomes by 50% or more in India compared to rain-fed irrigation. In Rwanda, smallholding farmers' yields have grown by about a third. The use of solar irrigation also displaces current and future fossil fuel use as the land area under irrigation expands. In so doing, it lowers emissions. Bangladesh's Nationally Determined Contribution under the Paris Agreement, for example, identifies solar irrigation as a key measure to mitigate climate change. Life-cycle emissions for solar-powered water pumping are estimated to be 95% to 98% lower than for pumps powered by grid electricity or diesel fuel.

Cold storage and refrigeration are a necessity at every stage of the agri-food chain to increase shelf life, cut losses, and maintain the quality of products from crops, livestock and fisheries. Losses disproportionately occur in the "first mile" between harvesting and processing; such losses are estimated to account for 37% of the food products lost in Sub-Saharan Africa. Improving access to refrigeration could prevent spoilage of up to a quarter of the perishable foods currently produced in countries with less-developed cold storage infrastructure. Renewables-based solutions offer several advantages, including decentralised cold storage capable of reaching smallholder farmers and remote fishing communities, and the power to transition existing infrastructure to more environmentally friendly and affordable energy solutions. In Kenya, for instance, decentralised renewables-based cold storage infrastructure reduces losses and improves market access for farmers, providing up to 30% additional income through aggregation and shortening of the value chain. Various technological options are available; these need to be adapted to the local context and cooling needs. As in these examples, Bhutan equally has the potential to use renewables-based solutions in the agri-food supply chain. In the rural villages and fields, water sources are scattered, and it is often financially and economically unfeasible to extend the power transmission lines to pump water for irrigation or for development of cold storage at high altitudes. If the Department of Renewable Energy and the Ministry of Agriculture and Forest were to collaborate and agree on implementation mechanisms, they could come up with excellent solutions for such situations.

8.3 Construction Industry

The construction industry is one of the important sectors that contributes to the economic development of the country. It transforms various resources into physical economic and social infrastructure necessary for socio-economic development. Bhutan has made, directly or indirectly, some progress in most of the sectors towards achievements in sustainable practices through policy interventions. However, the country report on sustainability and empirical observations showed priority intervention requirement in the management of construction and demolition waste. There is no specific policy or targets set at the national level for sustainable management of construction and demolition waste, nor does the national waste inventory

report include such data. The construction companies and their employees lack awareness and knowledge of construction waste management and the benefits that can be derived from adopting the 3R practices. Low awareness and concern among public are among the causes for limited recycling implementation. Awareness should be created at the grassroots level. Due to lack of governmental enforcement, there has been very little improvement in construction waste management practices. Rapid development of the construction industry will further increase construction waste in landfills, shortening their life spans. Waste reduction through the 3Rs practice should be encouraged in the construction industry for sustainable waste management.

There is a large gap between demand and supply of construction materials in the country. The materials like bricks produced locally are more environment friendly compared to imported clay/mud bricks. The process in the manufacture of clay bricks involves emission of GHGs during the firing and cooling stages as well as the generation of ash and solid waste. However, preference is always given to imported products. Usually, the selection of products is governed by their price. Imported goods, works and services with lower price therefore have an advantage over local products. It is therefore of utmost importance to encourage smart consumption to minimise imports of goods.

Bhutan needs to build capacity for the development, promotion and use of green/sustainable technologies. That would lead to improved resource and energy use efficiency in the country. For example i) more energy efficient building design and construction will reduce energy consumption; ii) energy efficient and scientifically developed public transportation will reduce the consumption of and dependence on fossil fuels; iii) use of improved available construction methods like rammed earth walls, which can be readily built at the construction site and are environment friendly; iv) selection of suitable building materials – large surface glass-clad buildings are not friendly for birds as they often die when they hit against the buildings; v) adoption of environmentally friendly road construction techniques with extensive engagement of Bioengineering; and vi) implementing glulam (glued laminated timber) technology to reduce waste in the wood industry and also converting wood waste into manure.

The SCP-HAT analysis concluded that Bhutan has been inefficient in material use, with extraction rate of 12.7 tonnes per capita, which is three time higher than the regional average of 4.6 tonnes per capita. The air pollution is high at the household level, having increased by 23% from 1996 to 2015; and in same period, GHG emissions increased from 1.3 million tonnes to 2.6 million tonnes, mainly from construction, mining and manufacturing industries. It also showed that about 90% of the land footprint comes from the domestic market while 10% is imported. Bhutan is increasingly sourcing natural resources indirectly from abroad via imported products. High procurement standards should be applied regarding pressures and impacts related to production processes abroad.

8.4 Waste management

The existence of policies, laws and regulations governing 3R in construction waste is minimal in Bhutan. There are no specific regulations formulated for construction waste management. The related regulations and legislations enforced by the government are too liberal. The lack of governmental enforcement has resulted in minimal improvement in waste management practices. Waste producers will not address construction waste management if enforcement is not mandatory. Effective implementation of construction waste management strategies, particularly 3R, requires coordination and cooperation among local, national and regional authorities. Lack of cooperation among waste generators and relevant agencies is often a result of different agencies not being aware of what other national agencies are doing, which leads to inefficiency.

8.5 Tourism

Expanding tourism activities has been a key objective, of which cultural tours, nature-based activities, nature tours and wellness tours have been the primary focus. Bhutan has been aware that an unrestricted flow of tourists could negatively impact its pristine environment and unique culture, and thus the government adopted a policy of "high-value, low-volume" tourism in order to control the type and quantity of tourism right from the start. It also introduced a Sustainable Development Fund for which a fee has to be paid by tourists to compensate for the negative environmental impacts associated with tourism. It has undoubtedly contributed to the unique tourism brand for Bhutan. However, much more can still be done

to improve sustainability in the tourism value chain. Tourism puts pressure on the consumption of food, water and energy, often forcing the economy to produce and import more. Transport is the main user of fossil fuel in Bhutan and immediate intervention is needed to convert the transport value chain to green transport for tourism. Hotels and restaurants have to be educated on the seasonal foods available in the country so as to avoid import of packaged foods and to reduce GHG emissions from the waste. There is also a need to create awareness on SCP amongst the tourist drivers about sustainability with examples like driving with unbalanced tyre pressure can consume more fossil fuel.

8.6 Transport Sector

Currently, the government has rolled out plans to replace 300 taxis with electric cabs but it will not bring the intended result unless there is an attractive monetary and fiscal policy in place to encourage private vehicle owners to switch to electric vehicles. The development of efficient public transport system lags behind significantly. Only recently, the government has put in place more ambitious plans to improve public transport services. Improving the urban public transport systems in terms of area coverage and services; introduction of electric passenger bus services in urban centres, and the promotion of electric cabs and passenger cars, together with the development of a supporting infrastructure is the only solution for Bhutan to reduce the import of fossil fuels.

8.7 Capacity and Awareness Creation

The core SCP issues such as product and material life cycles, natural resource use, environmental impact of transnational trade, and thermodynamics of energy production and consumption are covered substantially at the tertiary education level for students of related programmes. SCP learnings are also included in the Technical and Vocational Education and Training curriculum, civil servant training and non-formal education.

However, the link is yet to be established between the present educational structure, awareness programmes and environmentally friendly, sustainable behaviours. Reports have noted that there is disconnect in the Bhutanese society between environmentally friendly attitudes and actual behaviours. The practice of illegal open dumping of waste (littering on small and large scale) indicates that the traditionally ecofriendly ethos of the country and the incorporation of environmental studies in the education curriculum have not yet solved the problem of the lack of civic sense in personal behaviour [NEC, 2016, p.43]. A survey carried out in 2016 among a few schools in Thimphu for "EGO to ECO challenges"[4] also showed that students had little or no idea about what the term "sustainable" meant. Although teachers responded that they had a fair understanding about the concept of sustainability, none of them felt confident about their ability to teach it. The survey also indicated that most students and their families do not practice simple sustainable habits (carpooling, turning off the tap while applying soap, unplugging appliances when not in use, etc.). Thus, one can conclude that SCP is a topic relevant for individuals, the public and private sectors as well as for decision-makers. There is thus an urgent need to increase knowledge about SCP and to bridge the knowledge of different actors at all levels with science and concrete applications.

The country's SCP report also identified the need to build additional capacity towards using SCP goals and metrics, and the SDGs in general, like understanding and using macro-level data to guide sector-wise activities (NEC, 2016, p.44). For example, calculating the national Domestic Material Consumption and Material Footprint would be the broadest indicator to monitor progress on SCP and build capacity at all levels. This would then allow more targeted recommendations to be made sector-wise, for example, guiding the setting of electricity tariff for industries, determining cut-offs for tax incentives for using local raw materials in production, evaluating the benefits of the paperless office project, and identifying the ideal balance of trade value from an SCP point of view.

The availability of accurate and updated data, and the capacity to generate accurate data and analyse it, are still notable challenges [Lutter, 2019; Schandl et al., 2016]. The national data, though available, is occasionally unreliable or contradictory. Therefore, capacity building for data generation, data curation and quality control, data discovery, and dissemination would also be valuable.

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4   Impact Evaluation Report, http://egotoeco.nt/reports/

9. Outlook

Bhutan has always been dedicated to sustainable development and has constantly engaged in global environmental action. The country signed multilateral environment agreements derived from Rio Summit 1992. All these multilateral environmental agreements helped the government to develop and strengthen national policies that pursue sustainable development.

As a proactive measure, Gross National Happiness (GNH) is prioritised over Gross Domestic Product (GDP) as the core of Bhutan's development philosophy. The fundamental ideas of GNH can be regarded as sustainable and consumption indicator developed in response to dissatisfaction with the conventional gross domestic product measures, which do not capture many aspects that are central for people's wellbeing.

SCP is a topic relevant for individuals as well as for the public and private sectors. However, consumers, businesses, the public sector and decisionmakers in Bhutan lack knowledge about SCP. Thus, there is a need to connect different actors' knowledge with science and concrete application. Greener and more sustainable products and services require availability of new skills for their production and maintenance. Presence of greener technologies require specialists who might not yet exist or who do not possess all the required skills. The transition towards a more SCP economy will require massive response at the level of industry, government, public and private sectors, and multi-stakeholder partnerships. It will eventually demand radical transformation of education and training systems. Many areas of SCP, however, often overlap indicating challenges from the perspective of knowledge development. The complexity of the SCP area requires broadening orientation, from understanding the problem, to analysing it, identifying solutions (linking theory and practice), and focusing on the proposed solution to understand the consequences the proposed intervention. With such universal recognition of the role of education, understanding the impact of education has long been the major challenges for giving it an adequate place among planned interventions. Development of successful educational responses requires transformation of the education system itself, making it more adapted to societal changes, developing skills for often very different learning strategies, and continuously engaging with critical SCP stakeholders.

Yet, Bhutan still lacks understanding of the significance of life cycle thinking and a systems approach. Despite the favourable context, most sectors of the economy in Bhutan encounter difficulties in implementing sustainable consumption and production practices (SCP) and developing sustainable habits due to lack of knowledge, capacity and poor enforcement of existing laws. The consumers, business and public sectors, decision-makers in Bhutan lack knowledge about SCP and there is a need to bridge different actors' knowledge with science and concrete application. The transition towards a more SCP economy will require massive response at the level of industry, government, public-private sector and multi-stakeholder partnerships. It will eventually demand radical transformation of education and training systems in Bhutan. Greener and more sustainable products and services require availability of new skills for their production and maintenance. Presence of greener technologies requires specialisation that might not yet exist and specialists who do not possess all required skills.

The SCP Report for Bhutan 2016 further recognised that existing indigenous knowledge and practices on sustainable natural resource management systems in the local communities can bring a great contribution to the modern approach of SCP but the risk of such knowledge eroding is visible under the modern economic pressures and should be addressed (NEC, 2016). Therefore, strengthening the concept of SCP within the school curriculum and linking it with sustainable behaviour will be important steps for Bhutan to realise its national commitment to Gross National Happiness and sustainability.

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Annex 2

Nine Student Attributes

i. Knowledge and understanding

Every student must get the opportunity to realize their innate potential to become fully literate and numerate. With these basic skills, they can not only adapt intelligently to the challenges of life but are also capable of contributing to the wellbeing and happiness of their community and the nation. Students will acquire deep knowledge and understanding of Science, Technology (including ICT competence), Engineering, and Mathematics (STEM), the vital tools they need to succeed in higher education or function effectively in a competitive economy. In addition, students must develop mastery over the languages, especially Dzongkha (the national language) and English (the language of education, opportunity and mobility). In addition to literacy and numeracy, they are knowledgeable and productive users of technology, especially ICT, as an indispensable tool for success in all areas of learning. Being in a multilingual society, students will also be encouraged to develop knowledge of the dialects. They will acquire sound knowledge and understanding of human history, society, culture, ecological sustainability, and heritage. For holistic development, every student will get the opportunity to develop practical knowledge and experience of Bhutanese culture, art, architecture, music, sport, media, and spiritual practice.

ii. Intellectual competence

Every student needs to possess a spirit of inquiry and learn how to continue acquiring knowledge throughout their lives, to be able to connect different pieces of knowledge. Immersed in a dynamic culture of learning characterized by innovative curricula, creative pedagogies and authentic assessment of learning, students will develop higher-order thinking skills such as the ability to analyze, synthesize or evaluate information, judge complex situations through critical reasoning, anticipate and seek creative solutions to problems. They will master a range of cognitive skills that include the ability to innovate, to generate new possibilities, and to create new ideas or knowledge.

iii. Communicative competence

The ability to communicate effectively with others is an important determinant of effective functioning in different situations of life. Every student must be given the opportunity to attain the highest level of competency in Dzongkha, the national language, and English, the international language of communication. This will enable the students to collaborate and communicate effectively with fellow Bhutanese, to build relationships beyond the community, to be globally aware, and to communicate effectively across cultures. Students are able to clearly express opinions and intentions in oral and written form. As a result of quality education in the languages, they are able to engage in effective listening, understanding, and conversation in personal and public situations. They use the conventions of speech that show respect and sensitivity to others. They are able to explain their positions on, and understanding of, complex issues.

iv. Enduring habits of life-long learning

Students are able to understand the value of hard work and apply the concepts of academic disciplines in the real world, including work demands and social and cultural situations. Hence, every student must receive the opportunity to cultivate sustained learning habits and educational efforts should inculcate in our children a personal commitment to enduring habits of life-long learning, and pride in the achievement of excellence. The ability to independently drive one's own learning, coupled with the appreciation of the value of lifelong learning. With the abilities developed, students should be able to apply knowledge and critical thinking outside of familiar academic contexts. Developing the capacity to learn and realise one's full

potential as an individual; playing an active role in own learning; being able to plan activities independently, collaborate, work in teams and communicate ideas; making sense of the world and thinking about how things have become the way they are; being on the path to continued success in further education, training or employment; acquiring the skills to make informed learning and employment decisions throughout life and being motivated to reach full potential.

v. Family, community and national values

Students are able to recognize and appreciate that the family is the foundation of social health and harmony. It is the most fundamental school where the values of care, kindness, compassion, love, gratitude and respect are learnt and internalized. They have a high sense of gratitude and are able to reciprocate what the family has given them with profound gratitude. They show deep capacity to influence the wellbeing and happiness of others through these values. In a positive learning environment, students learn to show mutual respect for each other and take care of each other. These values are then passed on to the community. Students show respect and appreciation for the values of the community. They will participate in community activities, cultural events and services and are committed to vitalize local culture and local wisdom. They are able to understand self in relation to the people around them, care for others, and contribute to social wellbeing and harmony. They are able to stay involved in the community, take care of community property and its environment, and uphold the values of equality and justice in the community. Students show a deep understanding of Bhutan's past and present and understand the country's social, economic, cultural, political, environmental, and spiritual values that make it and its people unique. With the knowledge and conviction they possess about the country, students develop an unshakeable sense of national identity and how it is imperative for Bhutan's sovereignty and independence. With this sense of belonging, every student will identify themselves proudly as Bhutanese regardless of their socio-economic status, geographical location, linguistic difference, or religious affiliation. This sense of patriotism will be nurtured through understanding the values of inclusiveness, tolerance, acceptance, and respect for diversity. With deep knowledge and understanding, students see themselves as not only citizens of Bhutan but also citizens of the Earth. They understand that the values of GNH go beyond the borders of Bhutan.

vi. Spirituality and Character

The principles and values of Gross National Happiness are deeply embedded in the consciousness of Bhutanese students. Students will see reality clearly, will not be trapped by the lure of materialism, and will care deeply for others and for the sustainability of natural world. They develop personal values and attributes such as compassion, honesty, resilience, empathy and respect for others. Spiritually strong, they possess self-awareness, personal identity, and self-worth which enhance their emotional wellbeing. Hence, students are able to comprehend, identify, use and manage emotions in self and others. The education system will provide opportunities to develop character through the formal curricula, educating for GNH programs, classroom learning, projects, social interactions, and the informal curricula such as sports, the arts, and co-curricular activities. Ethically, students are able to understand moral and ethical values and act in accordance with these principles in their own lives and uphold them in their communities. They are honest and resistant to corruption with a strong sense of justice. Students will practice right livelihood based on ecological consciousness and with a strong sense of the dignity of labour. Students will learn the values of integrity – to possess the courage, the discipline, and the will to do the right thing. Conscious of the interdependent nature of self and others, culturally aware, tolerant of other cultures, and respectful of diversity, students are ready to take on the role of a global citizen.

vii. Physical wellbeing

School education must provide every student the opportunity to access quality physical education to develop physical competence, fitness, self-esteem and self-responsibility. Students take their physical education seriously and pursue an active and healthy lifestyle through regular exercise, and healthy eating and nurturing positive attitudes. Physical education in school should serve as a lab for application of students' knowledge of health and social studies that they acquire through the curricula. Students understand and appreciate the value of regular, healthful physical activity while in school and later in adult life. Through training in self-discipline in remaining physically fit, students accept responsibility for their

own health and fitness. Physically fit, students are intellectually, socially and morally strong and show emotional stability and resilience. With improved self-confidence and self-esteem and positive people skills, they are able to avail opportunities to assume leadership or cooperate with others.

viii. Leadership competence

Bhutan believes that the quality of education children receive today will determine the character and conviction of its future citizens and leaders. Every student must get the opportunity to develop their innate potential for leadership in the areas where they excel. Being able to work effectively with and lead others is critical, especially in democratic Bhutan and in an increasingly inter-connected and globalized world. Hence, learning experiences in school must be designed in such a way that the students are able to take on leadership roles, to learn leadership values and skills, and to work effectively in teams. Students will especially develop leadership attributes such as Knowledge (understanding of the discipline and of the world), Enterprise (ability to generate creative solutions, ability to take risk and the drive to see these through to their realization), Resilience (ability to develop a mindset that is positive and constructive as well as willing to withstand setbacks), Empathy (ability to understand the other person's thoughts and feelings and willingness to care for or help them, hence ability to understand and work effectively with others and to influence them positively), and Communication (ability to listen effectively to others, to ask effective questions, engage in effective high impact conversations, build trust, to set directions to meet goals, and to mentor others).

ix. World-readiness

Every student who completes school has the knowledge, skill and attitudinal readiness to face the challenges of the real world. Students are able to understand the value of hard work and apply the concepts of academic disciplines in the real world, including work demands and social and cultural situations. They are able to show analytical reasoning, critical thinking, and creative problem solving skills. In addition to literacy and numeracy, they are productive users of technology, especially ICT, as an indispensable tool for success in all areas of learning. With effective leadership skills, students are able to make decisions that are considerate of others. They are culturally sensitive and committed to the Bhutanese values of sustainability and the preservation of the environment. Able to connect knowledge from all curricular areas to enhance understanding of the world, they are willing to work towards solving the issues that confront Bhutan. Caring and compassionate, knowledgeable and emotionally sound, students are able to contribute to national development.

Annex 3

SCP Units- scope and opportunities in education curricular materials

By **Jigme Tshering**, project Junior Non-Key Expert

Table 1 Data collection methods and respondent categories.

Data Collection Methods	Description of Respondents
Key Informant Interviews	1. Focal Person, Environment Science and Primary Science, Department of Curriculum and Research, Ministry of Education. 2. Dean, Department of Curriculum and Research, Ministry of Education.
Individual Interviews	1. Environmental Science Teacher (VII-X), Department of School, Ministry of Education. 2. Science Teacher (IX-XII), Department of School, Ministry of Education. 3. Lecturer, CST, Royal University of Bhutan. 4. Lecturer, Teacher Training College, Royal University of Bhutan. 5. Lecturer, Jigme Namgyel Engineering College, Royal University of Bhutan. 6. Focal Person, Construction Development Corporation Limited. 7. Focal Person, Department of Renewable Energy 8. Focal Person, Bhutan Power Corporation. 9. UNESCO Nat Com. Education Program Officer.
Focus Group Discussion	1. CEO and Chief engineer, Rigsar Construction Private Ltd. 2. CEO and General Secretary, Association of Bhutanese Tour Operators (ABTO). 3. Education program coordinator and project coordinator, Royal Society for Protection of Nature (RSPN). 4. SCP focal person and Chief (Climate change), National Environment Commission.

The stakeholder propositions included the units on SCP appropriate in education and curricular materials for Bhutan. The inclusion of general SCP topics in K-12 education and courses in college and higher institutions would be essential for ensuring sustainable consumption in the future.

Some of the specific SCP topics raised as a part of the consultation process are (see Table 2).

Table 2 Units on SCP.

• Food Supply Chain and Food Sustainability • Watershed Management/ Unaccounted Water/ Water Footprint • Green Building/Energy-Efficient Buildings • Sustainable Agriculture • Eco-friendly/Environment-friendly Construction/ Sustainable Buildings and Construction • Green Tourism/Sustainable Tourism	• Sustainable Transport/ Sustainable Mobility • Waste Management • Energy Efficiency/Energy Saving/Sustainable Energy Consumption • Recycling -Reduce - Reuse – Recycle (3Rs) • Carbon Footprint (CF) • Sustainable Procurement / Green Procurement • Production Cycle (source to end) • Sustainable Products	• Circular Economy/ Sustainable Economy • Sustainable Use of Local Resources (e.g. sustainable logging/harvest) • Responsible Consumers (e.g. reusable/reusability) • Sustainable Use of Natural Resources • Economy of Resources • Environmentally Sound Technologies • Climate Resilience • Endangered Species