Contract N° Asie / 2014 /351-934 SRI LANKA	**Formulation of a Sri Lankan SCP Educational Program Plan along with Educational Materials** **Mission Report 1: SCP Education Plan Programme for Sri Lanka**

SCP Educational Plan Programme for Sri Lanka

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Contents

Acknowledgement ..... **v**
Abbreviations ..... **vi**
List of Boxes ..... **ix**
List of Figures ..... **ix**
List of Tables ..... **x**
Executive summary ..... **xi**
1 Introduction **1-1**
1.1 Education for Sustainable Development 1-1
1.1.1 Sustainable Development *1-1*
1.1.2 Education for Sustainable Development *1-1*
1.1.3 Progress of Education for Sustainable Development *1-2*
1.1.4 Integrated Context of Education for Sustainable Development *1-4*
1.2 Sustainable Consumption and Production 1-6
1.2.1 Human Behaviour and Lifestyle *1-6*
1.2.2 Transformational Change of Human Behaviour and Lifestyle *1-7*
1.2.3 Sustainable Consumption and Production and its Link to Sustainable Development *1-10*
1.2.4 Principles of Sustainable Consumption and Production *1-11*
1.2.5 Key elements and holistic approach in SCP *1-12*
1.2.6 Role of Education in SCP *1-12*
1.3 Background of the SWITCH-Asia SCP NPSC SL Project 1-13
1.3.1 Overview *1-13*
1.3.2 Key Components *1-14*
1.4 Education Sector of the draft National SCP Policy 1-15
1.4.1 Overview of the draft National SCP Policy *1-15*
1.4.2 Education Sector SCP Policy *1-16*
1.5 Overview of the Education Project Component 1-17
1.6 Introduction to the Structure of the Report 1-19
References 1-19
2 Methodology **2-1**
2.1 Overview 2-1
2.1.1 The Basic Approach *2-1*
2.1.2 The Strategic Planning Process *2-2*

2.2 Project Activities 2-2
2.2.1 List of Tasks 2-2
2.2.2 Description of Activities and Sub-activities 2-4
2.3 Implementation Strategy 2-6
2.3.1 Overview 2-6
2.3.2 Resource Allocation & Mobilization 2-7
2.3.3 Sustain Momentum 2-7
2.3.4 Mainstreaming ESCP 2-8
2.3.5 Monitoring and Evaluation 2-8
2.3.6 Review and Update 2-9
References 2-9
3 In Country Situation Analysis 3-1
3.1 Education System in Sri Lanka – An Overview 3-1
3.2 SCP related Education in Sri Lanka 3-2
3.2.1 Overview 3-2
3.2.2 Early Childhood Education 3-3
3.2.3 School Education 3-4
3.2.4 University Education 3-6
3.2.5 Technical and Vocational Education 3-8
3.2.6 Continuous Professional Development 3-9
3.2.7 Other: Non-formal & Informal Education 3-10
3.3 Conclusions 3-10
References 3-11
4 Situational Analysis on Regional and International Initiatives 4-1
4.1 Overview 4-1
4.2 Regional and International SCP Education Programmes 4-9
4.2.1 Regional Programmes 4-9
4.2.2 International Programmes 4-13
4.2.3 Vocational Education and Training 4-17
4-17
4.2.4 Early Childhood Education 4-17
4.2.5 Non-formal Education 4-20
4.3 Appraisal of SCP Educational Projects 4-21
4.3.1 SCP Education Activities under SWITCH-Asia Projects 4-21

4.3.2 UNITAR e – learning course on SCP 4-23
4.3.3 Asia – Pacific Winter School on SCP 4-24
4.3.4 Other SCP Education Projects and Activities 4-26
4.4 Conclusions 4-27
5 Formulation of SCP Educational Programme Plan 5-1
5.1 Situational Analysis 5-1
5.1.1 In Country Situation 5-1
5.1.2 Regional and International Situation 5-2
5.2 Analytical Framework 5-3
5.2.1 Overview of the Planning Process 5-3
5.2.2 Policy and Institutional Frameworks 5-4
5.2.3 Legislative and Regulatory Framework 5-7
5.2.4 Strategic Areas of Interventions 5-7
5.2.5 Forms and Levels of Education 5-8
5.2.6 Academic Disciplines 5-10
5.2.7 SCP Curriculum 5-11
5.2.8 Roles and Responsibilities of Stakeholders 5-14
5.2.9 Monitoring Framework 5-14
5.3 SCP Educational Plan Programme 5-15
5.3.1 SCP Educational Goals 5-15
5.3.2 Governance & Management 5-16
5.3.3 Education Methodologies 5-16
5.3.4 Core Competencies (CCs) 5-16
5.3.5 Programme Outcomes (POs) 5-18
5.3.6 SCP Thematic Areas and Subject Topics 5-18
5.3.7 SCP Education Plan for Specific Education Sector – An Overview 5-19
5.3.8 SCP Education Plan for Tertiary/University Education 5-20
5.3.9 SCP Education Plan for Early Childhood Education 5-25
5.3.10 SCP Education Plan for Primary Education 5-27
5.3.11 SCP Education Plan for Secondary Education 5-28
5.3.12 SCP Education Plan for Technical & Vocational Education 5-29
5.3.13 SCP Education Plan for Continuing Professional Education 5-29
5.3.14 SCP Education Plan for Non-formal Education 5-30
5.3.15 SCP Education Plan for Informal Education 5-30

5.3.16 Development of Curriculum and Course Materials for Common Core Module.....5-31

5.4 Capacity Building Requirement 5-31

5.4.1 Rationale 5-31

5.4.2 The Approach.....5-32

5.4.3 Priority Areas 5-32

5.5 Overall Results 5-33

5.6 Implementation Plan 5-34

References.....5-35

6 Recommendations 6-1

7 Annexes 7-1

Annex 1: Subject Topics under SCP Thematic Areas 7-1

Annex 2: Result Matrix 7-10

Annex 3: Action Plan.....7-14

Annex 4: List of Contributors 7-16

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A list of the experts and organizations contributed to the study is given in Annex 4.

Abbreviations

10YFP	10-Year Framework of Programmes
AIT	Asian Institute of Technology
APRSCP	Asia Pacific Roundtable for Sustainable Consumption
ARIES	Australian Research Institute in Education for Sustainability
BLISS	Building Learning in Sustainability Science
CEA	Central Environment Authority
CEDEFOP	Centre for the Development of Vocational Training
CCs	Core Competencies
CP	Cleaner Production
CPE	Continuing Professional Education
CPD	Continuing Professional Development
CPM	Competitive Profile Matrix
CRI	Coconut Research Institute
CSR	Corporate Social Responsibility
DESD	Decade of Education for Sustainable Development
ECCD	Early Childhood Care and Development
EFA	Education for All
EFE	External Factor Evaluation
EPP	Environment Pioneer Programme
ESC	Education for Sustainable Consumption
ESCP	Education for Sustainable Consumption and Production
ESD	Education for Sustainable Development
ETF	European Training Foundation
EU	European Union
F&B	Food and beverage
GAP	Global Action Programme
GEM	Global Education Monitoring
GHG	Greenhouse gas
GRFSCP	Global Research Forum on Sustainable Consumption and Production
GUPES	Global Universities Partnership on Environment and Sustainability
HESI	Higher Education Sustainability Initiative
IAEWG	Inter-Agency Expert Working Group
ICS	Improved Cook Stoves
ICT	Information and Communication Technologies
IE	Internal-external matrix
IEGS	Institute for Global Environmental Strategies
IESE	Institute of Environmental Sciences and Engineering

IESL	Institute of Engineers Sri Lanka
IFE	Internal Factor Evaluation
ISCED	International Standard Classification of Education
LCA	Life-Cycle Assessment
LOs	Learning Outcomes
MDGs	Millennium Development Goals
MoMDE	Ministry of Mahaweli Development and Environment
NAITA	National Apprentice and Industrial Training Authority
NAP	National action plan
NAPA	National Academy of Public Administration
NARSCAP	North American Roundtable on Sustainable Production and Consumption
NCPC	National Cleaner Production Center
NDCs	Nationally Determined Contributions
NERDC	National Engineering Research & Development Center
NIE	National Institute of Education
NPS	National Productivity Secretariat
NPSC	National Policy Support Component
NUST	National University of Sciences and Technology
NVQ	National Vocational Qualifications
OPA	Office of Public Affairs
PBL	Project Based Learning
PDCA	Plan-Do-Check-Act
POs	Programme Outcomes
RCE	Regional Centres of Expertise
RECP	Resource Efficient and Cleaner Production
RRI	Rubber Research Institute
SACEP	South Asia Cooperative Environment Programme
SCs	Specific Competencies
SC	Sustainable Consumption
SCORAI	Sustainable Consumption Research and Action Initiative
SCP	Sustainable Consumption and Production
SCP/RAC	Regional Activity Centre for Sustainable Consumption and Production
SD	Sustainable Development
SE	Sustainable Energy
SEC	School Energy Clubs
SED	Sustainable Environmental Design
SET	Sustainable Environmental Technology
SDGs	Sustainable Development Goals
SLEMA	Sri Lanka Energy Managers Association

SLIDA	Sri Lanka Institute of Development Administration
SLSEA	Sri Lanka Sustainable Energy Authority
SMEs	Small and Medium Enterprises
SP	Sustainable Production
SPP	Sustainable Public Procurement
SRM	Sustainable Resource Management
SST	Sustainability Science & Technology
SUMAS	Sustainability Management School
ToT	Training of Trainers
TRI	Tea Research Institute
UGC	University Grant Commission
UN	United Nations
UNCED	UN Conference on Environment and Development
UNDESA	UN Department of Economic and Social Affairs
UNIDO	United Nations Industrial Development Organization
UNIVOTEC	University of Vocational Technology
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNU	United Nations University
UNU-IAS	United Nations University Institute for the Advanced Study of Sustainability
WCED	World Commission on Environment and Development
WSSD	World Summit on Sustainable Development

List of Boxes

Box 1-1: Target 4.7 of the SDGs ix
Box 1-2: Pillars of GUPES 1-3
Box 1-3: Priority actions areas to advance the ESD agenda 1-5
Box 1-4: Definitions of sustainable lifestyle 1-7
Box 1-5: Hydraulic civilization and sustainability practices in ancient Sri Lanka 1-9
Box 1-6: Definitions of SCP 1-10
Box 1-7: Focus areas of SWITCH-Asia SCP NPSC SL Project 1-14
Box 1-8: Key results areas of SWITCH-Asia SCP NPSC SL Project 1-14
Box 1-9: Key components of SWITCH-Asia SCP NPSC SL Project 1-15
Box 1-10: Trust areas of the draft National SCP policy 1-16
Box 3-1: Formal education system in Sri Lanka 3-1
Box 3-2: Energy Club programme implemented by SLSEA 3-6
Box 3-3: Subjects offered in BSc Green Technology programme 3-7
Box 3-4: Two CPD programmes offered by NCPC 3-9
Box 4-1: National CP Centre Programmes across Asia Pacific region 4-6
Box 4-2: Selected European organizations that offer VET in sustainability 4-17
Box 4-3: Case studies of early education programmes in sustainability **Error! Bookmark not defined.**
Box 4-4: Case of Bhutan's efforts to foster sustainability education in school children .**Error! Bookmark not defined.**
Box 4-5: Example of SCP training for national administrative staffs .... **Error! Bookmark not defined.**
Box 4-6: Sustainability in Australian Public Service ..... **Error! Bookmark not defined.**
Box 4-7: Course on SCP in Teri University as a part of SWITCH- Asia Regional Policy ..... **Error! Bookmark not defined.**
Box 4-8: Online Course on SCP organized by UNITAR ..... **Error! Bookmark not defined.**
Box 4-9: Topics discussed in UN Winter School on SCP in Asia and Pacific in AIT ..... **Error! Bookmark not defined.**
Box 5-1: Sectoral Level Coordination – SCP Education Sector 5-6
Box 5-2: Forms of education 5-8
Box 5-3: Definitions of programme learning outcomes 5-13
Box 5-4: Monitoring framework for SCP education plan programme ... **Error! Bookmark not defined.**

List of Figures

Figure 1.1: Integrated context of ESD 1-5

Figure 1.2: Factors contributing to human behaviour and their lifestyles 1-6
Figure 1.3: Different layers of context in lifestyle 1-8
Figure 1.4: Ancient iron and steel smelting furnaces in Sri Lanka 1-9
Figure 1.5: Application of SCP policies and tools from a life cycle perspective 1-12
Figure 2.1: Main strategic planning stages and activities 2-2
Figure 2.2: Key tasks in a step-cyclic process of the methodology 2-3
Figure 3.1: Energy educational materials for training of preschool teachers 3-4
Figure 3.2: Energy educational materials for training of preschool teachers 3-5
Figure 3.3: Number of degrees offered under different disciplines 3-6
Figure 4.1: The evolution of concepts of CP, SD and SCP 4-1
Figure 4.2: Key changes during the progression of CP, SD and SCP 4-4
Figure 4.3: UNIDO-NCPC to RECPnet progress 4-6
Figure 4.4: Number of SCP related projects in Asia 4-7
Figure 4.5: Various types of projects related to SCP 4-8
Figure 4.6: Sectors covered under SCP projects 4-8
Figure 4.7: Proportion of academic departments offering sustainability courses 4-10
Figure 4.8: Number of listed courses in sustainability in Asia Pacific region 4-11
Figure 4.9: SWITCH Asia funded SCP education projects 4-26
Figure 5.1: Implementation & monitoring framework for the national policy on SCP 5-5
Figure 5.2: Individual and collective goals and competencies **Error! Bookmark not defined.**
Figure 5.3: Overall framework of the SCP education curriculum for a given sector ..... **Error! Bookmark not defined.**

List of Tables

Table 2.1: Blueprint contrast between traditional planning and strategic planning 2-1
Table 3.1: Undergraduate degree programme related to SCP 3-7
Table 3.2: Postgraduate degree programmes related to SCP 3-8
Table 4.1: List of few international programmes in sustainability 4-14
Table 5.1: Levels of formal education system 5-9
Table 5.2: Stakeholders of SCP education plan programme at operational levels 5-14
Table 5.3: Core competencies of the SCP education plan of Sri Lanka 5-17
Table 5.4: Programme outcomes of the SCP education plan of Sri Lanka 5-18
Table 5.5: Core competencies and specific competencies in tertiary/university education 5-21
Table 5.6: Thematic areas and subject/topics in tertiary/university education curriculum 5-22
Table 5.7: Thematic areas and LOs in tertiary/university education curriculum 5-24
Table 5.8: List of training programmes 5-33
Table 5.9: Administrative arrangements for sector-specific implementation of activities 5-33

Executive summary

As the global economy continues to grow, the exploitation of resources is expected to increase in order to meet the needs and demands of the growing population and urbanising communities. But, the signals are getting clearer: if the "Business as Usual" is allowed to continue, consumption of Earth's resources will quickly outpace the rate at which they are replenished. In fact, the effects of unsustainable consumption and production of resources have already been realised at present as climate change impacts, water stresses, energy crisis and rising amount of waste and their disposal costs have plagued the quality of life amongst the world's poor, particularly in the developing countries. It has been estimated that current practices of consumption and production would require at least three planet's worth of resources by 2050. In the Asia-Pacific region, the relevance of this situation is even greater. With the economic growth in the region, an emerging middle class, increasingly urbanising, has started to embrace a "Western" perspective of a "good life" in the expense of their traditional consumption patterns.

With this information in the backdrop, the concept of sustainable consumption and production (SCP) becomes significant as it aims to de-link economic development from environmental degradation. SCP has been seen as a critical link to encompass traditional approaches of cleaner production and sustainable development in one circle in order to incorporate various facets of sustainability into the mainstream of economic development. To this end, Sri Lanka is aiming to promote SCP by inculcating the topic into formal, non-formal and informal forms of education. The European Union funded SWITCH-Asia Sustainable Consumption & Production National Policy Support Component (NPSC) for Sri Lanka has taken the lead in this endeavour and has been thoroughly supported by the Ministry of Mahaweli Development & Environment and also the Ministries in charge of Education and Higher Education along with respective line agencies to devise a comprehensive plan of action.

This document, SCP Educational Plan Programme for Sri Lanka, has been prepared to extract broad research findings by key stakeholders and experts in the field while also providing case studies of SCP programmes across regional and international platforms. It has been categorised into six chapters in which the first chapter explains the concepts of sustainable development and the role of education in promoting the same. This chapter also touches upon the topic of human behaviour and lifestyle to establish its relevance in consumer behaviour. Chapter two outlines the five-stage methodology to be adopted in implementing this programme, which includes setting the context and analysing the gaps, followed by developing the work plan and then implementing the same. After this, monitoring and evaluation will be done to understand and compare the changes before and after

implementing the programme, the findings of which will be used to review and update the programme. Chapters three and four include an in-country and regional situation analysis respectively to highlight the present situation of SCP education in Sri Lanka and Asia-Pacific region. This has been done by providing case studies and examples of best practices. In Chapter five, the main work of the study on formulation of SCP education plan programme has been presented based on the main findings of the situation analysis in the previous two chapters. The overall framework and details of the curricula of informal, non-formal and formal forms and six levels of education (early childhood, primary, secondary, tertiary/university, technical & vocational, and continuing professional development) in the SCP education plan have also been included in this chapter. Finally, the report has been summarised in Chapter six in which the way forward for successful implementation of SCP has been recommended.

The in-country situation analysis signifies the country's priority on the education sector, and also the emphasis on management of natural resources and the environment in the development agenda. Accordingly, a gradual inclusion of SCP related subject topics across all the sectors (i.e. forms and levels) of education could be recognised. Some learning is materialized through insertion of SCP related topics in relevant subjects in the curricula, while some skill developments and practices are promoted through non-formal education means outside the formal curricula. The examples of such initiatives include Eco Clubs, School Energy Clubs (SEC), Environment Pioneer Programme (EPP) and Green Schools. However, the underpinning principles of SCP such as multidisciplinary context, interdisciplinary insight, system-thinking and life-cycle approach, which are required to achieve a transformative change in the society, are still not adequately reflected. Further, though the sustainable production is articulated in some education programmes, particularly at University and Continuing Professional Development (CPD) education systems, the sustainable consumption concepts are not given much attention. Another drawback is the lack of connectivity of SCP related learning between different levels of education. Under these circumstances, the inclusion of SCP in the whole education system is identified as an urgent need by the stakeholders, not only for the progression of the education sector itself, but also shaping the entire society for effective attainment of socio-economic development of the country.

The review of the regional and international status of SCP related education reveals similar advancements as experienced locally, as highlighted above. The adverse impact of unsustainable consumption and production of resources on global environment and economy has led to intense discussions on the need to shift towards sustainable development pathways. The traditional education approaches in the two specific areas of energy and environment have gradually merged together to transpire as education in cleaner production (CP), which

subsequently evolved to the education in sustainable development (ESD) with the emphasis on sustainable consumption. Accordingly, promotion of sustainable production and sustainable consumption as a common goal becomes a necessity, as affirmed when it was included as a standalone goal (Goal 12) among the 17 Sustainable Development Goals (SDGs). A number of international organisations and donor agencies reacted promptly to initiate a variety of educational and capacity building programmes, notably European Union-SWITCH-Asia Programmes and United Nations (UN) agencies such as UNESCO, UNEP, UNIDO, UNESCAP, UN-DESA, UNU. Many countries also responded positively to global movements to initiate national level educational programmes. For example, some of the countries in the region, notably Japan, Bhutan and Thailand, have taken steps in implementing the SCP concept by conducting nationwide campaigns. Conclusively, number of interventions has to be taken on priority basis, such as developing and publicising a more concrete definition of sustainability within the curriculum, sustainability-related and sustainability-focused courses while increasing the capacity for providing the faculties with the necessary professional development, resources, incentives, recognition, and support for developing and implementing the sustainability curricula. Through such programmes, SCP education can be promoted, which will consequently bolster economic development without overexploiting the available resources.

The development and implementation of the SCP education plan programme for Sri Lanka are primarily based on a stage-wise but cyclic process with prospects for stakeholder consultations and continuous improvements. The main findings of the in-country and regional/international situation analysis were used to formulate the SCP education plan, targeting all the sectors of education covering formal, non-formal and informal forms and early childhood to professional and adulthood levels. The curriculum is formulated in an overarching framework for developing nine core competencies (CCs) targeting eight programme outcomes (POs) through an interconnected lifelong learning process. In order to facilitate the selection of topics for SCP education, twenty themes have been identified, reflecting topics having a broad relevance for the purposes of specific SCP education programmes and their wider context in the society. A list of more specific-subject topics under each thematic area is also identified, which needs to be revised, as and when necessary, to accommodate the changes in the contexts. In order to enable the sector specific attributes, while maintaining connectivity and the flow, each specific education sector should establish sector/subject specific competencies (SCs) aligning with the CCs and sector/subject specific learning outcomes (LOs) aligning with the POs, while identifying sector-relevant subject topics under each SCP thematic areas. This leads to the formulation of a common core module on SCP for each of the six levels of formal education sector identified, amidst multiple, diversified perspectives from different academic disciplines, subject topics or age, followed by preparation of a detailed syllabus, teaching/learning tools, teaching/learning

materials and evaluation scheme. The application of this methodology is demonstrated for the tertiary/university education sector, and only the key guiding sectoral features are presented for the other five sectors in this report. Within the concept of the common core module, the non-formal and informal educations are not considered as separate stages of SCP education, though they could contribute significantly to the effective learning of SCP. In the present approach, these two sectors are treated as integral parts of six education sector categories, providing complementary and supplementary learning tools for enhancing the education processes and outputs therein. The development of curricula for SCP education in the non-formal and informal sectors needs completely different approach, which is not included in the present study as it is beyond the scope.

It is recommended that the SCP education plan programme is implemented under a sound framework encompassing prospect for right governance, while facilitating effective coordination, collaboration and engagement of the key government institutions and other stakeholders, with a process of continuous improvements through lateral inputs from local and international experiences. This could be effectively realized by having two main levels of organisational decisions and processes viz. hierarchical model of policy planning, policy implementation & monitoring framework at strategic level, and implementation framework for sectoral programmes, projects and activities at functional and operational level. Once the common core module is formulated, the introduction to the existing curriculum should be identified by considering the characteristics of a given education sector category for the best progression of the SCP education plan programme. Fundamentally, this could be realized as a combination of the three approaches, namely (i) different topics are taught in relevant subjects of the curriculum; (ii) integrated into the curriculum as a specific subject; (iii) taught as a cross-cutting interdisciplinary theme and incorporated into similar courses, projects and other activities across academic entities. The resource requirements and capacity building needs have to be identified and addressed before the implementation of the activities of the SCP education plan programme.

The following action plan is proposed for the implementation of SCP education plan programme for the period 2017 to 2022, which includes eight main activities namely Establishment of administrative framework, Development, adoption and launching of SCP education plan programme, Development of sectoral curricula and materials, Capacity building, Introduction /delivery of common core modules, Sustain momentum, Monitoring & Evaluation, and Review & Update. This action plan is formulated and scheduled for achieving the policy goal “SCP introduced to the early childhood education, school education, university education, vocational education and professional education systems as a life skill before 2025” in the draft National SCP Policy – Education Sector. Under each activity, a number of sub-activities/tasks is identified with more specific time durations for

successful implementation and monitoring the progress. In particular, the first activity on establishment of administrative framework includes setting up of, firstly SCP Policy Advisory and Monitoring Committee and secondly Sectoral Focal Point on SCP – Education during the 4th quarter of 2017, to oversee the timely implementation of all the other activities.

Activity	2017				2018				2019				2020				2021				2022			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Establishment of administrative framework																								
Development, adoption and launching of SCP education plan programme																								
Development of sectoral curricula and materials																								
Capacity building																								
Introduction/ delivery of common core modules																								
Sustain momentum																								
Monitoring & Evaluation																								
Review & Update																								

In conclusion, the priorities in the education sector and the specific area of SCP within global agendas and local aspirations signify the central role of education for sustainable consumption and production (ESCP) on the transformational change of human behaviour and lifestyle necessary for the practice of SCP in the professional, educational, and other life contexts and eventually make SCP a life-skill. SCP education plan programme for Sri Lanka thus becomes a national priority, which needs active involvement of many stakeholders, and demands for interventions in many levels, resource mobilisation and capacity building. The commitment of relevant institutions and stakeholders for overcoming these challenges and timely implementation of necessary actions would be vital for the success of the programme.

1 Introduction

1.1 Education for Sustainable Development

1.1.1 Sustainable Development

Ecosystems sustain human societies that create economies. Unfortunately, the economic development pathways of the human society as a whole demonstrate excessive use of natural resources and significant adverse impacts on the environment. Consequently, human society has become the dominant force that shapes ecological and biophysical systems. For about half a century, the humanity's demand for natural resources has exceeded the planet's bio-capacity for regeneration of these resources, as demonstrated by ecological footprint. Presently, the ecological footprint shows that 1.5 Earths would be required to meet the demands humanity makes on nature each year [1]. With this background, the concept of sustainable development (SD) emerged, which acquired its meaning through several discussions, conferences, writings and debates. It was the United Nations (UN) World Commission on Environment and Development (WCED) or Brundtland Commission that framed the concept, in a way that led to its common use and wide understanding, as "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [2]. Within the UN system, this SD concept was accepted during the UN Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil in 1992; The World Summit on Sustainable Development (WSSD), held in Johannesburg, South Africa, in 2002; and then the second Rio Conference, the UN Conference on SD (Rio+20) held in Rio de Janeiro, Brazil in 2012. It was at this Conference, the directions for the post-2015 Agenda were set [3].

On 25 September 2015, the UN General Assembly adopted the 2030 Agenda for Sustainable Development, a new global framework that redirects humanity towards a sustainable path. At the core of the 2030 Agenda are 17 Sustainable Development Goals (SDGs), with 169 targets between them. The aim of the SDGs is to secure a sustainable, peaceful, prosperous and equitable life on earth for everyone now and in the future. The SDGs cover global challenges that are crucial for the survival of humanity, which address a range of social needs including education, health, social protection and job opportunities while tackling climate change and environmental protection. They also address key systemic barriers to sustainable development such as inequality, unsustainable consumption patterns, weak institutional capacity and environmental degradation [4].

1.1.2 Education for Sustainable Development

Although sustainable development has featured prominently on the international agenda for three decades, related global issues continue to escalate, indicating a need for a

comprehensive strategy for collective actions. It has been recognised that policy instruments or technological solutions alone are not sufficient and profound transformational change in the way people think and act (behavioural changes) was critical for achieving sustainable development. The individuals require the knowledge, skills, attitudes and values that empower them to contribute to sustainable development. Thus, the role of education in its broadest sense becomes a key strategy for achieving the SDGs [3]. Accordingly, SDGs include a separate goal on education as SDG4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. In particular, education for sustainable development (ESD) is explicitly recognised in the Target 4.7 of the SDG on education (see Box 1-1). Further, it is emphasised that ESD is crucially important for all the other 16 SDGs [5].

Box 1-1: Target 4.7 of the SDGs

> 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 nonviolence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

1.1.3 Progress of Education for Sustainable Development

Almost seventy years ago, education was declared as a basic human right for every person and enshrined in the Universal Declaration of Human Rights in 1948. Since then, it has been reaffirmed by many other international human rights instruments. In 1990, over 150 governments adopted the World Declaration on Education for All (EFA) at Jomtien, Thailand to boost efforts towards delivering the right to education. Ten years later, the World Education Forum in Dakar, Senegal reaffirmed this commitment and adopted the six EFA goals that run to 2015. Commitment towards the right to education was also reflected in the UN Millennium Development Goals (MDGs), set in 2000 with a deadline for achievement by 2015. There were eight MDGs, of which two focused on education.

In 2002, the UN General Assembly adopted a resolution for the initiative on Decade of Education for Sustainable Development (DESD) 2005-2014 [6]. United Nations Educational, Scientific and Cultural Organization (UNESCO) was designated as lead agency for the UN DESD. Along with the EFA movement and MDGs process, the UN DESD aimed to achieve an improvement in the quality of life, particularly for the most deprived and marginalised, fulfilment of human rights including gender equality, poverty reduction, democracy and active citizenship. In response to the UN DESD, the United Nations University (UNU) called for the development of networks to promote ESD and to emerge as expertise centres for the research development of ESD, which has led to the establishment of Regional Centres of

Expertise (RCE) supporting ESD. Further, the United Nations Environment Programme (UNEP) has facilitated the establishment of the Global Universities Partnership on Environment and Sustainability (GUPES) in 2012 as a flagship contribution to the UN DESD. GUPES aims to promote the integration of environment and sustainability concerns into teaching, research, community engagement, the management of universities, greening of university infrastructure and operations, as well as to enhance student engagement and participation in sustainability activities in the universities around the world. GUPES is anchored on three pillars, namely education, training and networking (see Box 1-2). GUPES currently has close to 800 partner universities worldwide.

Box 1-2: Pillars of GUPES

Education	Networking	Training
Focuses on inspiring, mentoring, informing, supporting, facilitating and enabling universities to undertake curriculum innovations for sustainability as well as greening of universities. Development of curricula sourcebooks on priority environment and sustainability challenges, including Massive Open Online Courses.	To encourage and strengthen regional and sub-regional higher education networks on environment and sustainability modelled around continents, UNEP regions as well as North-South and South-South frameworks all feeding into the GUPES network.	Improve competence by enhancing knowledge and awareness on UNEP's priority areas; equip the target audience with the relevant skills, values and attitudes on environment agenda, issues & emerging concepts through scheduled training courses in universities as well as environment and sustainability seminars and leadership programmes.

GUPES
Global Universities Partnership on Environment and Sustainability

In 2013, the General Conference of UNESCO endorsed the Global Action Programme (GAP) on ESD as the follow-up to the UN DESD. The GAP employs a two-fold approach to multiply and to scale up ESD action, namely: (1) integrating sustainable development into education, and (2) integrating education into sustainable development [7]. The experience of the UN DESD lays the foundation for developing programmes to meet the educational needs required to achieve the SDGs [3]. Through the Incheon Declaration adopted at the World Education Forum in May 2015, UNESCO, as the United Nations' specialised agency for education, was entrusted to lead and coordinate the Education 2030 agenda with its partners. The roadmap to achieve the ten targets of the education goal is the Education 2030

Framework for Action, adopted in November 2015, which provides guidance to governments and partners on how to turn commitments into action [8].

Although it appears that there are considerable efforts in the ESD, particularly related to the SDGs, those have been predominantly sourced in international/global contexts. The actual progress at national/local level towards the set targets would not be realised without national government and society buy-in, and without evidence of national initiatives for implementation. In particular, there is a huge challenge for monitoring education related targets and indicators in SDGs as, in addition to the ten targets in SDG4, there are direct references to education in six of the SDGs that contain either education-related targets (SDGs 3, 8 and 13) or education-related indicators (in SDGs 1, 5 and 12) [9]. Accordingly, the Incheon Declaration affirmed the mandate of the Global Education Monitoring (GEM) Report as the mechanism for monitoring and reporting on the SDG4 as well as on education targets in the other SDGs. The 2016 GEM Report is the first of a new 15-year series, which shows that education will not deliver its full potential to propel the world forward unless participation rates dramatically improve, learning becomes a lifelong pursuit and education systems fully embrace sustainable development. It indicates that the development of curricula is the main way for the countries to promote ESD. Three-quarters of countries had some emphasis on SD in their curricula over 2005–2015, but there are gaps in several aspects including subject areas covered, resources, teacher training, assessment methods, monitoring, etc. [10].

1.1.4 Integrated Context of Education for Sustainable Development

ESD is an integral part of lifelong learning, engaging all possible learning spaces of formal, non-formal and informal, from early childhood to adult life. It involves the integration of aims of education with the broad span of social, economic, environmental and cultural policies for sustainable development. It is transformational education, which addresses learning content, learning outcomes, and teaching and learning environment. ESD should be based upon a holistic approach to education, positioning it within national education systems, policies and programmes. There could be a range of different factors that shape how it is viewed and how it can be developed and practised in any context, as illustrated in Figure 1.1 [11]. As all these factors influence ESD, active networking and interaction amongst stakeholders are important as part of a process approach to policy and practice. In order to generate and scale up concrete actions in ESD, enabling of strategic focus and fostering of stakeholder commitment become essential. In line with this, UNESCO GAP has identified five priority action areas to advance the ESD agenda, as illustrated in Box 1-3 [7].

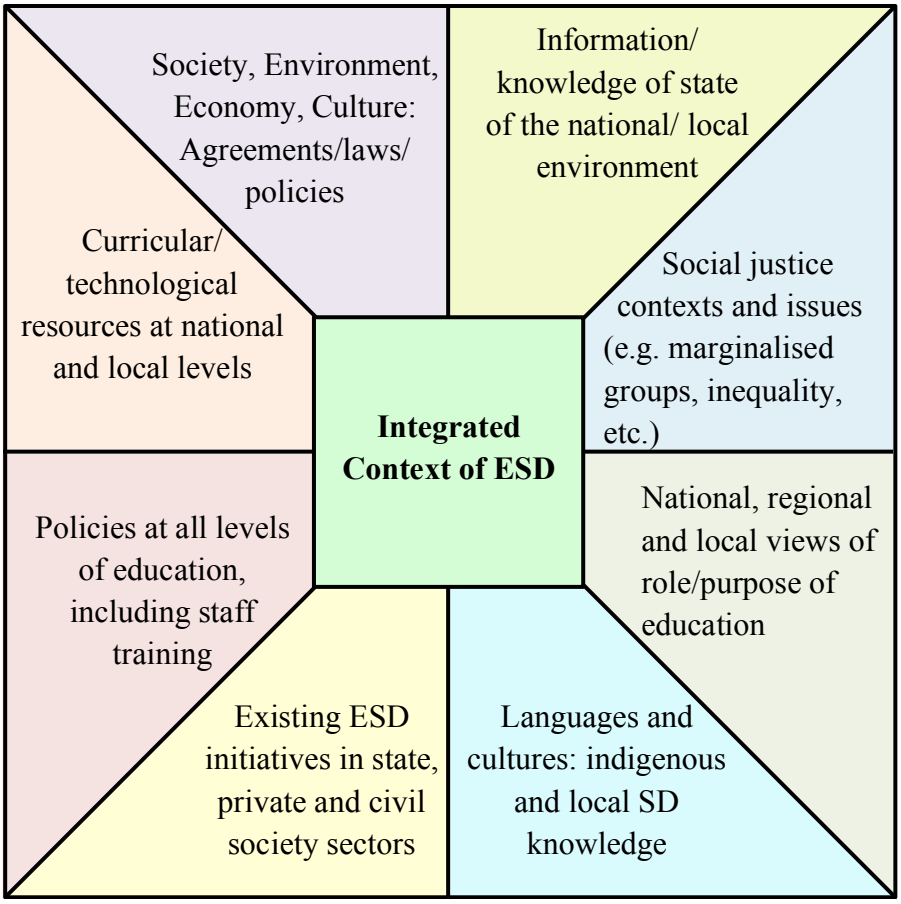

Figure 1.1: Integrated context of ESD

Box 1-3: Priority actions areas to advance the ESD agenda

Priority Action Area 1

Advancing policy: Mainstream ESD into both education and sustainable development policies, to create an enabling environment for ESD and to bring about systemic change.

Priority Action Area 2

Transforming learning and training environments: Integrate sustainability principles into education and training settings.

Priority Action Area 3

Building capacities of educators and trainers: Increase the capacities of educators and trainers to more effectively deliver ESD.

Priority Action Area 4

Empowering and mobilizing youth: Multiply ESD actions among youth.

Priority Action Area 5

Accelerating sustainable solutions at local level: At community level, scale up ESD programmes and multi-stakeholder ESD networks.

UNESCO encourages governments to set national targets for ESD, based on local requirements and aspirations in line with SDGs. The following four strategies established at the global level could be adopted at the national level to incentivize national initiatives [7]:

- creating momentum through a call for commitments,
- harnessing partnership synergies,
- setting up platforms to exchange information and ideas, and
- recognising and awarding good practices and initiatives.

1.2 Sustainable Consumption and Production

1.2.1 Human Behaviour and Lifestyle

The human behaviours and lifestyles are complex phenomena and reflect as social prints of living, and frame/influence the choices made for consumption, living, travelling, working, social relationships, health, etc. (Figure 1.2). They are shaped by the needs and desires of individuals, and also manoeuvred by social and institutional contexts (influencers and motivators).

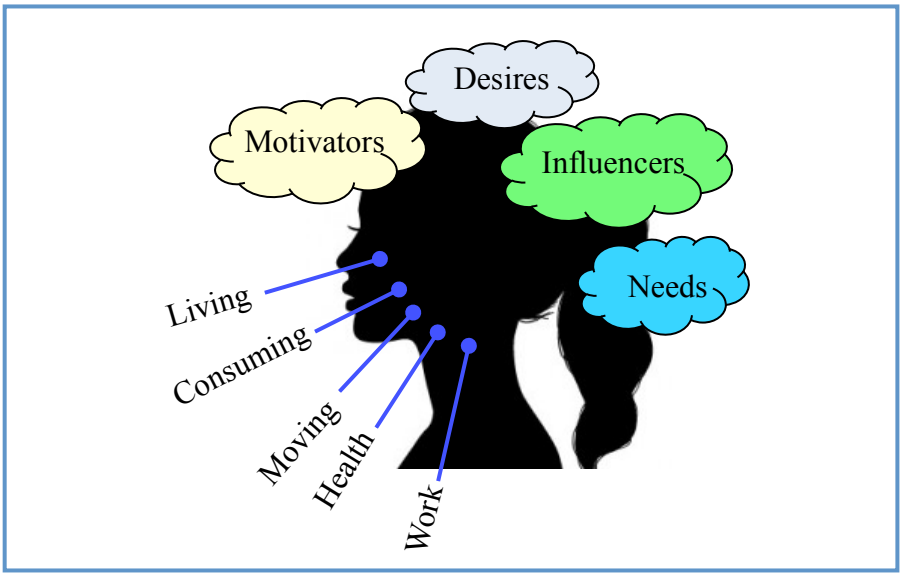

Figure 1.2: Factors contributing to human behaviour and their lifestyles

Problems that arise from human behaviours and lifestyles could be more effectively addressed by altering human behaviour than by attempting to develop a technological solution. However, the realisation of desirable lifestyles could be challenging for individuals, and technology may be applied indirectly as a tool to motivate behavioural change. However, changing behaviours is far from straightforward, not only due to the influence of wide-ranging behaviour factors (such as beliefs, norms, attitudes, values, habits, experience, self-efficacy, awareness, altruism, perceptions, leadership, knowledge and identity), but also they

are deeply embedded in situational contexts (such as culture, geography, social learning, information, institutional & regulatory frameworks, access to capital, social networks and infrastructure), and a combination of various types of instruments such as policy, economic, regulatory, administrative, information and technology is required in an integrated system [12, 13].

1.2.2 Transformational Change of Human Behaviour and Lifestyle

Transformational change and paradigm shift are becoming important terms within the vocabulary of the sustainable development, so does the term sustainable lifestyle. Though there is no unique definition for transformational change, in the context of sustainability, it may be theoretically defined as a structural change that alters the interplay of institutional, cultural, technological, economic and ecological dimensions of a given system [14].

The sustainable lifestyle, too, has various definitions, yet the essentiality is that it should address the role of material and resource consumption as well as the broader context within which lifestyles occur, for instance, appreciation of the people's desires for happiness, recognition of the ecological limits to meet demands, and acknowledgment of the interdependence among people in a shared consumption space (see Box 1-4). In essence, a sustainable lifestyle means meeting basic needs and living well while embracing the idea of sufficiency.

Box 1-4: Definitions of sustainable lifestyle

- A fundamental definition [15]

A cluster of habits and patterns of behaviour embedded in a society and facilitated by institutions, norms and infrastructures that frame individual choice, in order to minimize the use of natural resources and generation of wastes, while supporting fairness and prosperity for all.

- An operational definition [16]

A sustainable lifestyle minimizes ecological impacts while enabling a flourishing life for individuals, households, communities, and beyond. It is the product of individual and collective decisions about aspirations and about satisfying needs and adopting practices, which are in turn conditioned, facilitated, and constrained by societal norms, political institutions, public policies, infrastructures, markets, and culture.

In any case, transformational change from unsustainable lifestyle to sustainable lifestyles is a complex task, involving many changes on many levels, in many domains and among many people, regulations and institutions, as illustrated in Figure 1.3 [12].

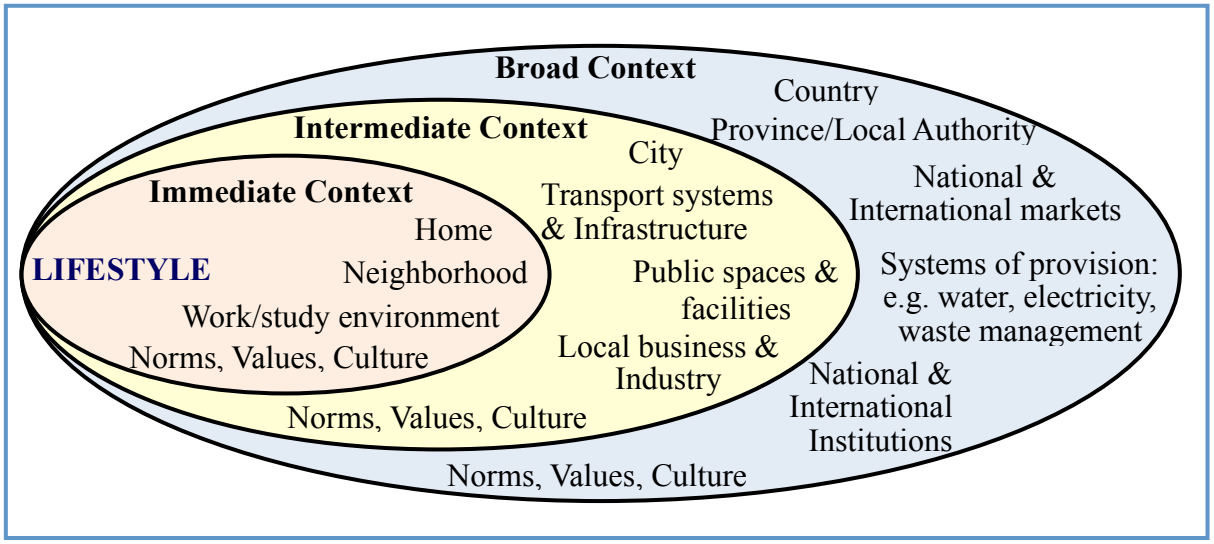

Figure 1.3: Different layers of context in lifestyle

The present consumeristic society reflects the way of life and aspiration of the majority. In developed countries, the societies are already set into unsustainable lifestyles in general and others are aspiring to join in, particularly the urban youth in developing countries. This trend continues while many others are unable to meet even their basic needs, thus leading to unsustainability in both ecological and social viewpoints. In spite of these trends, the interest and emphasis on sustainable lifestyles are gaining momentum. Although a wider adoption of holistically sustainable lifestyles is yet to be achieved, various communities are practising sustainable lifestyles at local levels, some of which could be traced back to ancient civilisations. In fact, basic concepts of sustainability could be identified in ancient civilisations in Sri Lanka.

The past traditional lifestyles of Sri Lanka, where life was centred on villages, temples and tanks, resulted in a more integrated community and equitable distribution of resources. These harmonious practices adopted by the people brought about not only environment and economic sustainability but also social and political stability, signifying the true long-term sustainability. For instance, ancient Sri Lankans developed a hydraulic civilisation, in harmony with the environment and achieved significant progress in engineering and technology (Box 1.5) [17]. In particular, the tank cascade systems maintain within them a variety of subsystems such as

- Ecological system with catchment forests, aquatic habitats and communities
- Elaborated water management system including sluices, spills, water control by canals and rational water distribution system
- Agricultural systems combining paddy lands, chena and home gardens and animal husbandry and governed by a traditional crop calendar and a fitting land use pattern
- Social systems with established institutions and leadership structures

- Cultural and spiritual norms that respect life in its all forms that promoted simple living and avoidance of conflict.

Box 1-5: Hydraulic civilization and sustainability practices in ancient Sri Lanka

Sri Lankan history is deeply connected with its hydraulic civilization, which was not just irrigation system but marked a sustainable water – soil – flora fauna – human ecosystem. Ancient Sri Lankans, led by their kings, have used much originality and ingenuity in developing water conservation and management. Rainwater which fell on a catchment was collected in a cascade of small tanks and used and re-used many times before coming to a large reservoir. In addition to supplying water for cultivation of paddy, the water stored in the cascade system was used for other services such as domestic bathing, livestock, inland fisheries and also to maintain waterbed and safeguard the ecosystem. The commitment of the top leadership was a key highlight, for example King Parakramabahu I (5th century BC) had declared that "no drop of water should flow into the sea without serving the interest of man", which demonstrate that ancient Sri Lankans had practised sustainable development.

Yet another engineering marvel of ancient Sri Lanka is the iron and steel manufacturing process and technology (Figure 1.4). It is believed that high-quality steel was produced in unique west-facing linear furnaces, powered driven entirely by the wind, signifying the use of a clean renewable energy source for production processes. The furnaces were situated on the western margins of hills and ridges, where they were exposed to the strong monsoon winds. Field trials using replica furnaces confirm that this furnace type uses a wind-based air-supply principle that is distinct from either forced or natural draught, and show also that it is capable of producing high-carbon steel [18].

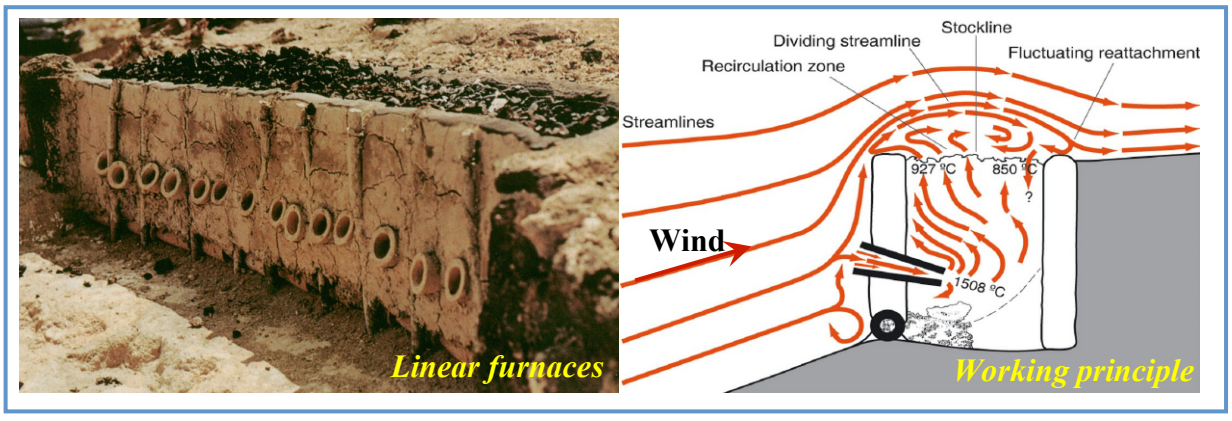

Figure 1.4: Ancient iron and steel smelting furnaces in Sri Lanka

1.2.3 Sustainable Consumption and Production and its Link to Sustainable Development

It is apparent that the lifestyles help to fulfil the desires and the needs of the individuals and also function as social conversations through which social positions in the society are communicated to others. Most of these communications are facilitated by the products consumed, the services utilised and the assets possessed. Further, it is not just consumption patterns of the consumers, but also the resource consumption and environment pollution in the production and supply of goods and services. As such, lifestyles have dominant impacts on the extraction and supply of materials and resources qualitatively and quantitatively, and are closely linked to production and consumption patterns in the societies [12]. Accordingly, the term sustainable consumption and production (SCP) has emerged alongside sustainable development. In fact, Agenda 21, the main sustainable development policy document to emerge from the 'Earth Summit' held in Rio in 1992, recognised that "fundamental changes in the way societies produce and consume are indispensable for achieving global sustainable development" [19].

There have been attempts by many to define the term SCP, two of which are presented in Box 1-6 [12]. The first is one most commonly used definition proposed at the 1994 Oslo Symposium on Sustainable Consumption. Since then the meaning of the concept has evolved over time and certain aspects have been added. For instance, the second definition provided by UNEP emphasises the requirement of a holistic approach [20]. Further, meaningful slogans for SCP also emerged, such as "Live & let others live" and "Living without being a burden to anyone" [21].

Box 1-6: Definitions of SCP

Definition 1

SCP is about the use of services and related products which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as the emission of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations.

Definition 2

SCP is a holistic approach to minimize the negative environmental impacts from consumption and production systems while promoting quality of life for all.

The global recognition of the need for SCP originated by Agenda 21 has led to a sequence of international initiatives for the promotion of SCP. In particular, the central role of SCP in achieving sustainable development was reaffirmed at the World Summit for Sustainable Development, Johannesburg, in 2002, where SCP was declared as one of the three

overarching objectives of, and essential requirements for, sustainable development; followed by the launch of the Marrakech Process on SCP at the first international expert meeting on 10-Year Framework of Programmes (10YFP) held in Marrakech, Morocco, organized by UNEP and UN Department of Economic and Social Affairs (UNDESA) Division for Sustainable Development in 2003 [20]. At the regional level, the Asia Pacific Roundtable for Sustainable Consumption (APRSCP) has taken a leading role in promoting SCP in the Asia-Pacific. It was started in Bangkok in 1997 mainly to promote cleaner production and resource efficiency. With the global trend to shift from strictly technical approaches to more socio-technical approaches that include consumer behaviour and psychology, the forum was renamed and given a new focus on the more challenging agenda and the broader subject of SCP. More details of the progression of SCP at regional and international levels have been presented in Chapter 4.

1.2.4 Principles of Sustainable Consumption and Production

As with the definition of the term SCP, which was re-emphasized with the global concerns related to sustainable development, the fundamental principles of SCP too apprehended broader dimensions beyond technical space, as given below [22]:

- Improving the quality of life without increasing environmental degradation and without compromising the resource needs of future generations.
- 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 the quality of life.
- Applying life-cycle thinking, which considers the impacts from all life-cycle stages of the production and consumption process.
- Guarding against the rebound effect, where efficiency gains are cancelled out by resulting increases in consumption.

The principles of SCP could be applied to any kind of sustainability intervention or concept, for examples resource efficiency/eco-efficiency, cleaner production, sustainable communities, green cities, poverty reduction, eco-innovations, green growth, and circular economy/industrial ecology, which provide a wide range of opportunities for socio-economic development while safeguarding the environment, thus contributing to achieve SDGs.

1.2.5 Key elements and holistic approach in SCP

Life-cycle thinking is one of the most important aspects in the SCP approach as it provides the framework for a holistic assessment and can be applied to any kind of system or value chain. It helps policy makers assess and evaluate not only the environmental footprint of individual products and production processes but also, more broadly, the environmental and socio-economic impacts from the consumptions and production of various goods and services, as illustrated in Figure 1.5.

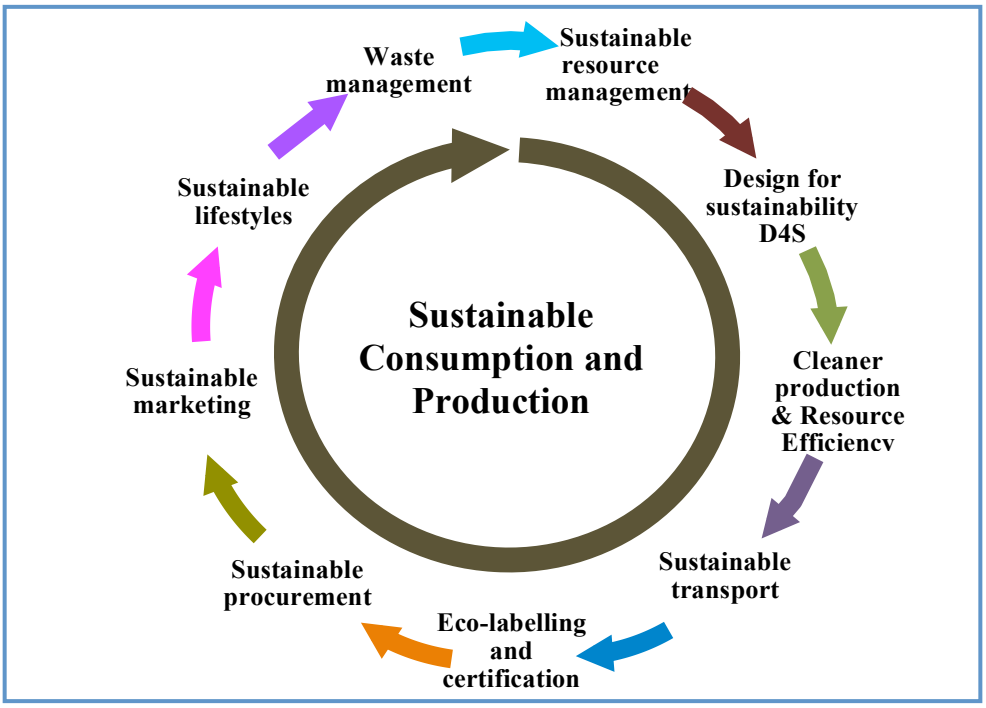

Figure 1.5: Application of SCP policies and tools from a life cycle perspective

1.2.6 Role of Education in SCP

The role of education in sustainable development was discussed in Section 1.1 under the concept of ESD. Though ESD and SCP are interrelated fields that in fact, some consider as sub-topics themselves of sustainable development, it is important to recognise the different approaches that these two fields have brought to promoting sustainable consumption. In general, efforts under the field of SCP aim at creating green markets and making it easier to practice sustainable consumption, while efforts as part of ESD aim at educating individuals to be more aware of the impacts of their consumption options and to influence changes in their behaviour. These two approaches can be broadly labelled as focussing on external factors and on internal factors, respectively. Education for SCP (ESCP) is a topic arising from two distinct but related fields. The promotion of ESCP is a topic discussed for achieving SCP. ESCP is also acknowledged as one of the priority subjects under ESD and is recognised as an

effective field for demonstrating the feasible applications of the underlying concepts and principles of ESD.

There are significant developments in ESD and education in other related areas such as environment and energy. In general, ESCP follows a wider uptake of ESD, but many aspects of SCP are still receiving limited emphasis in educational systems. In particular, the sustainable consumption aspects have received considerable emphasis in ESCP, and the term Education for Sustainable Consumption (ESC) is used more commonly within ESD. The 10YFP on SCP, education on SCP and sustainable lifestyles are identified as one of the priority programmes to be developed and implemented. The other areas of sustainable production too have received considerable attention with the initiatives of related topics such as cleaner production and resource efficiency. Still, incorporation of ESC in overall education programmes remains unformulated because of the current lack of capacity and leadership for the advancement of responsible consumer behaviour and promoting sustainable lifestyles. More details of the progress of ESCP programmes and initiatives are discussed in Chapter 3 and Chapter 4.

1.3 Background of the SWITCH-Asia SCP NPSC SL Project

1.3.1 Overview

SWITCH-Asia Sustainable Consumption and Production (SCP) National Policy Support Component for Sri Lanka project (NPSC) commenced in mid-January 2015 is a 4-year EU funded project awarded upon the request of the Ministry of Mahaweli Development and Environment (MoMDE) as a 'technical assistance programme' to support strengthening the overall government policies and institutional framework for implementation of SCP practices. The project aims to enhance capacity, skills, knowledge and understanding of key policy makers, stakeholders and the public about the main principles of SCP, available policies, tools, instruments and mechanism. The overall objective of the project is to support the Sri Lankan Government in selecting, adapting and implementing suitable economic and regulatory policy instruments to promote SCP, thereby enhancing the long-term sustainability of consumption and production patterns. The specific objective is to strengthen the institutional and policy framework ensuring a joint and effective SCP effort to Sri Lanka.

In order to provide adequate policy framework to address key issues related to the need to harmonize economic development with environmental sustainability, the project has focused on the key areas of developing policy framework, strengthening institutional mechanism, facilitating implementation of sector-specific programmes, providing support for capacity development and facilitating education and awareness (Box 1-7).

Box 1-7: Focus areas of SWITCH-Asia SCP NPSC SL Project

- Developing an overall SCP policy framework, enhancing the economic, social and environmental benefits of SCP and providing further direction for upgrading the national policies in Sri Lanka;
- Strengthening the institutional mechanism for enhancing the capacity of the government to promote SCP (through the Project Steering Committee - PSC and setting up of Inter-agency Working Group);
- Facilitating SCP implementation in selected sectors, including fostering eco-innovation;
- Providing capacity development support through training of trainers seminars/workshops using both on-site and on-line e-learning methodology/study tours/exchange visits/higher education programmes;
- Raising awareness through a knowledge development platform and facilitating inclusion of SCP in educational programmes.

1.3.2 Key Components

The project is comprised of six key results areas and four components (Box 1-8 and Box 1-9). The implementation of the project is formulated under twenty-four main activities and many sub-activities.

Box 1-8: Key results areas of SWITCH-Asia SCP NPSC SL Project

- R1: National SCP Policy and Organizational set-up are strengthened;
- R2: Sustainable Production (SP) Framework is strengthened and SCP principles applied in selected sectors;
- R3: Sustainable Consumption (SC) Framework is strengthened and Green Procurement Policy & Eco-labelling implemented;
- R4: Knowledge on SCP is enhanced and awareness is raised among public/private sectors and civil society;
- R5: Information management data base on selecting, adopting and implementing suitable economic and regulatory policy instruments to promote SCP is developed;
- R6: Long-term sustainability of consumption and production patterns is ensured.

Box 1-9: Key components of SWITCH-Asia SCP NPSC SL Project

- C1: National SCP Policy & Organization
- C2: SP Framework and SCP principles for selected sector(s)
- C3: SC Framework, Green Procurement Policy & Eco-labelling implemented
- C4: SCP Knowledge awareness raising & knowledge development.

The key activities either completed so far or to be completed before the end of the project period (Mid-January 2017) and the deliverables could be summarised as follows:

- Standardisation of the policy formulation process in Sri Lanka;
- Draft of National SCP Policy;
- Baseline survey of Sustainable Production (SP) in 3 sub-sectors (tea, rice & dairy) of F&B sector;
- Consumer survey on SCP;
- Establishing National SCP Indicators;
- Introducing SCP tools:
  - ✓ Sustainable Public Procurement (SPP)
  - ✓ Life Cycle Approach
  - ✓ Framework for introducing Eco-labelling
  - ✓ Eco-innovation
  - ✓ Financial Mechanisms for the promotion of SCP
- E-learning platform for SCP
- Awareness & capacity building on SCP

In particular, the present component of the project on introducing SCP into the national education system has commenced on 1st February 2017 and this report presents the progress and the first deliverable.

1.4 Education Sector of the draft National SCP Policy

1.4.1 Overview of the draft National SCP Policy

As the first step towards mainstreaming SCP in the country, the activity on the development of a national policy on SCP, which is coherent and integrated with related sectoral policies, has been proposed after reviewing 46 national sectoral policies that have some relevance to SCP policy and consultation of stakeholders. The seventeen SDGs were consulted to identify the thrust sectors of the SCP policy, and related sectors were combined to establish twelve (12) thrust areas (Box 1-10). The policy document is presented in a new format proposed to be utilised for national policy documents in the future, which comprised of Policy Principles, Policy Statements and the Policy Goals of each thrust sector.

Box 1-10: Trust areas of the draft National SCP policy

1. Air	7. Transport
2. Water	8. Education & communication
3. Food	9. Science & Technology
4. Built environment	10. Industry
5. Energy	11. Tourism
6. Health	12. Waste.

1.4.2 Education Sector SCP Policy

The proposed Policy Principles, Policy Statements and the Policy Goals of the education sector SCP policy are as follows:

- *Policy Principle*:
  "Knowledgeable, conscious, inclusive and empowered nation on SCP"

- *Policy Statements*:
  - ✓ Sensitise all citizens to appreciate SCP as the basis for a good lifestyle;
  - ✓ Develop a national critical mass of human capital to promote SCP in all spheres;
  - ✓ Introduce SCP concepts into the Sri Lankan education system as a life skill;
  - ✓ Promote and inculcate Life Cycle thinking in/among all segments of the society;
  - ✓ Establish enabling environment for integrated and system thinking on SCP;
  - ✓ Empower public sector establishments on SPP;
  - ✓ Promote awareness of economic benefits of SCP in the private sector;
  - ✓ Create innovative research culture promoting SCP by establishing National innovation systems;
  - ✓ Enhance communication to drive behavioural change of the society for the shifting towards SCP;
  - ✓ Improve media ethics for behavioural change of the society for the shifting towards SCP;
  - ✓ Address psychological and social aspects of behavioural changes in SCP implementation;
  - ✓ Ensure right to access information on impacts of products and processes;
  - ✓ Guide and support consumers' choices for sustainable products and services and behavioural changes through information;
  - ✓ Provide, awareness, education, capacity building, and consultation on Eco-labels
  - ✓ Drive change in public-private partnership to ensure and foster best practices in consumer choices and behaviour;
  - ✓ Develop SCP indicators to monitor sustainable development;

- ✓ Hold periodic national multi-stakeholder roundtables on SCP to develop and update National Action Plan (NAP) on SCP and mainstreaming SCP into SDG development strategies by defining clear goals, targets and indicators;
- ✓ Organise high-level political events to validate and launch officially SCP national action plans and/or revised strategies.

- *Policy Goals*:
  - ✓ SCP introduced to the early childhood education, school education, university education, vocational education and professional education systems as a life skill before 2025;
  - ✓ SPP promoted in public sector establishments including local authorities;
  - ✓ Media programmes promoted including social media for targeted groups of general public on SCP;
  - ✓ E-learning opportunities provided for masses on SCP;
  - ✓ Revision of education policies supported in response to priorities identified in SCP Policy and action plans or related strategies;
  - ✓ SCP indicators and monitoring frameworks incorporated into national strategies and development plans on education;
  - ✓ Right to access information enforced on impacts of products and processes by 2020;
  - ✓ Funding support arranged for research and innovation on SCP;
  - ✓ Private sector educated on the economic benefits of SCP;
  - ✓ Administrative and legislative framework required for the promotion of SPP in the state owned or controlled education sector adopted before 2020;
  - ✓ Implementation of SPP ensured at least in 5 major product categories, in the state-owned or controlled education sector, that have a significant impact, before 2020 and at least 50% of product categories by 2030;
  - ✓ Lifecycle databases for above product categories either created or updated by 2025;
  - ✓ An action plan developed within one year of approving the policy.

1.5 Overview of the Education Project Component

The title of the education component of the SWITCH-Asia SCP NPSC for SRI LANKA project is "Formulation of a Sri Lankan SCP Educational Program Plan along with Educational Materials". There are two main deliverables:

A. Sustainable Consumption and Production (SCP) Educational Programme Plan for the educational system in Sri Lanka
B. A core training module to introduce SCP concept into the education system of Sri Lanka.

The methodology proposed for the successful accomplishment of the first deliverable includes the following:

A1. Literature survey and meeting with relevant resource persons to gather and synthesise the curricula and associated information on SCP and related subject areas such as Cleaner Production, Energy Management, Environment Management, etc. already developed and implemented in Sri Lankan University system and other educational establishments;

A2. Appraisal of similar projects initiated by international organisations such as SWITCH-Asia Project, UNEP, UNITAR, UNESCAP, UNU etc.;

A3. Consultation of key governing bodies in educational systems in Sri Lanka such as Consult University Grant Commission (UGC), National Institute of Education (NIE);

A4. National Apprentice and Industrial Training Authority (NAITA) to obtain advice on the theme;

A5. Further to the above, consultation with other key stakeholders and decision makers (meetings/workshop) to gather their views and suggestions;

A6. Critical analysis of the information gathered through above activities to establish a comprehensive strategy for the development of an SCP Educational Programme Plan for the education system in Sri Lanka;

A7. Conduct series of meetings/seminar with relevant Ministries, establishments, educational specialists and Inter-Agency Expert Working Group (IAEWG) members to validate the strategy on the development of SCP Educational Programme Plan;

A8. Based on the outputs of above, preparation of the SCP Educational Programme Plan for the educational system in Sri Lanka.

The fundamental approach proposed for accomplishing the second deliverable is similar to the above, as briefed below:

B1. Extract the presently used curricula/ course materials/ teaching guides from the information gathered in item 1.1 above, and synopsize;

B2. Establish Programme Outcomes (POs) of the SCP Educational Programme Plan prepared in 1.8 above;

B3. Develop educational materials for a core module to be offered as identified in SCP Educational Programme Plan, including curriculum, course materials and training guide;

B4. Conduct series of meetings/seminar with relevant Ministries, establishments, educational specialists and IAEWG members to validate the educational materials developed as per the item 2.3 above;

B5. Finalize the core module (including curriculum, course materials and training guide) for the introduction of SCP concept to the university education system in Sri Lanka;

B6. Identify the human resource requirement for the successful implementation of the educational programmes on SCP in Sri Lanka and make recommendations accordingly.

1.6 Introduction to the Structure of the Report

This report presents the materials related to the SCP Educational Plan Programme, the first deliverable of the education component of the SWITCH-Asia SCP NPSC for SRI LANKA project. The work is presented in five structured chapters: Chapter 2 to Chapter 6. Chapter 2 briefs the methodology adopted in performing the tasks, including the implementation strategy. The first stage of the methodology is the context setting and gap analysis, where the in-country and regional/international situations of the SCP related educational programmes are reviewed, findings of which are presented in Chapter 3 and Chapter 4, respectively. The progress of SCP related education, case studies and best practices are included in these two chapters. Chapter 5 presents the main work of the study on formulation of SCP educational plan programme for Sri Lanka. It includes the main findings of the situational analysis, the analytical framework and the details of the curriculum for different forms and levels of education in the SCP education plan, together with the implementation plan. Finally, overall recommendations are presented in Chapter 6.

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2 Methodology

2.1 Overview

2.1.1 The Basic Approach

The central role of ESCP in achieving sustainable development is evident, as on one side SCP is recognised as an overarching objective of and essential requirement for sustainable development and on the other side education becomes a key strategy for achieving the SDGs. The formulation and implementation of ESCP programme thus encompass the two distinct concepts viz. SCP (as illustrated in Figure 1.4 from a life cycle perspective) and educational planning under the context of sustainability (as emphasised with the integrated context of ESD illustrated in Figure 1.1). Further, as SCP emerges as an integral component of sustainable development its progression is primarily overseen by associated sectoral agencies (and governed by related processes), while educational plans are formulated and implemented by actors in specific layers of education. As such, ESCP represents a complex phenomenon demanding a focus on a stakeholder participatory approach and connecting it with a transdisciplinary and inter-sectoral framework envisaging actions around the SCP phenomenon and its deep relationship to the education of individuals and societies [1].

The complexity of ESCP demands for incorporation of a strategic planning process for its development and implementation, which is not just a technical undertaking that spells out objectives to be reached and actions to be taken, but requires an inclusive sense of purpose and direction capable of guiding implementers in making everyday choices on the actions to be taken in order to produce the expected results. The principles of such strategic planning in education could be illustrated by comparing and contrasting with traditional planning, as shown in Table 2.1 [2].

Table 2.1: Blueprint contrast between traditional planning and strategic planning

	Approach	
	Traditional Planning	**Strategic Planning**
Features	Input oriented	Result oriented
	Technocratic	Participatory
	Neutral	Mobilization instrument
	Linear planning	Iterative planning
	Rigid implementation	Flexible implementation
	Routine based	Change oriented
	Compliance monitoring	Performance monitoring
	Emphasis on the plan document	Emphasis on plan implementation

2.1.2 The Strategic Planning Process

Methodologies for strategic planning processes have been developed extensively across many sectors, including education, and the present study employs such general framework, as presented in abstract form in Figure 2.1 [2].

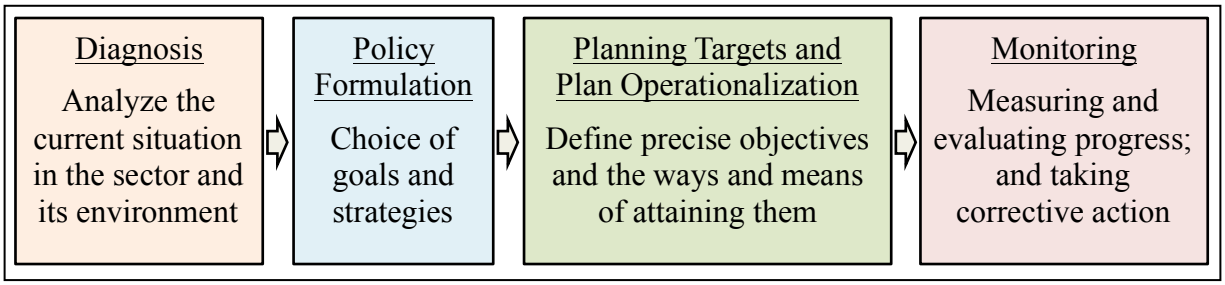

Figure 2.1: Main strategic planning stages and activities

Although there seems to be a logical, sequential order in the strategic planning process shown in Figure 2.1, some of the activities in these stages are often interdependent and influence each other. Thus, strategic planning has to be performed as an iterative process that involves cross-referencing repeatedly between the different activities in all the planning stages. It should also be noted that the process does not stop when plan implementation starts but has to include a monitoring cycle with multiple feedback loops within the process in order to make it adaptable and capable of responding to situational changes efficiently.

Another important aspect is that the progress of ESCP programme plan has to be assessed against the SCP related targets within the SDGs, as detailed in Chapter 4. SCP is directly reflected in the targets associated with thirteen out of seventeen SDGs, in which the SDG12 focuses on ensuring SCP patterns explicitly, while other targets streamline the SCP into a number of other SDGs. A set of indicators is required to monitor the activities to show whether and what rate the progress is being made towards achieving all the targets. Selection of indicators for the SCP related targets is challenging but important task, which has been attempted by many studies, particularly to provide information to assist the countries in the identification of such indicators [3, 4]. While these indicators generally comprised of both local and global indicators to monitor the progress, it is important to select and track the indicators according to their relevance based on country context, capacity and data availability, and also to define additional data and analysis are required.

2.2 Project Activities

2.2.1 List of Tasks

As the subject of consideration is complex in nature, development of a strategic approach itself is challenging. One way to get on with this status is to further breakdown the basic process shown in Figure 2.1 into more comprehensive, distinct but interconnected stages of

tasks with a clear designation of roles and responsibilities for the relevant government authorities and other stakeholders. Such a strategic approach represents a step-wise circular model of continuous learning and improvement process, which results in adaptive responses to changing circumstances and uncertainties.

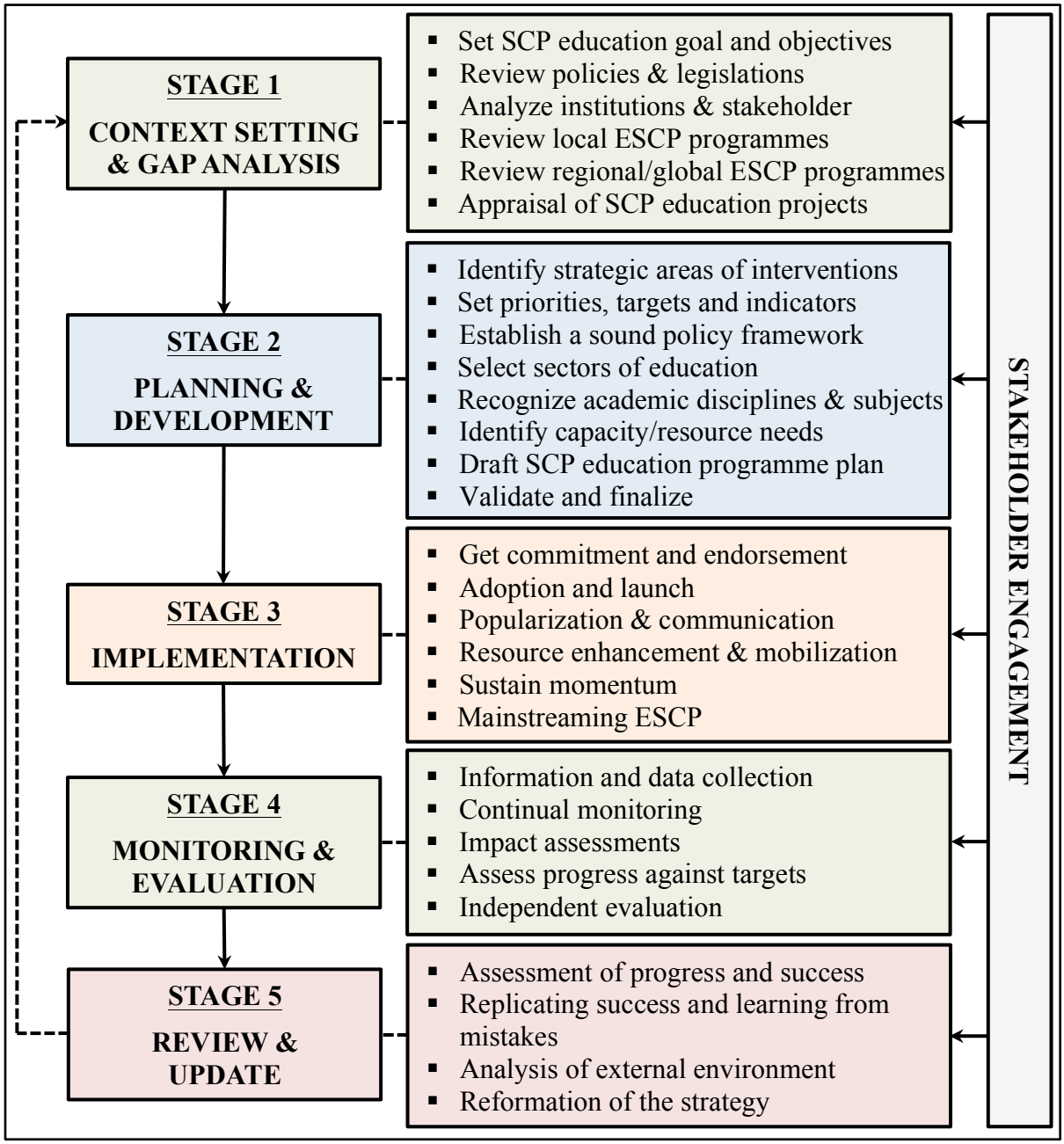

Figure 2.2: Key tasks in a step-cyclic process of the methodology

A variety of such detailed strategy formulation approaches could be found in the literature, which includes step-wise process and mapping of action-to-outcome relationships. In the

present study, the strategic approach for the development of ESCP programme plan is framed around five key stages: (i) Context setting & gap analysis; (ii) Planning & development; (iii) Implementation; (iv) Monitoring & evaluation; and (v) Review & update; in a cyclic process, as illustrated in Figure 2.2 above (adopted from [2], [5], [6], [7]). Under each stage, types of the tasks required have been listed.

The entire process of the development and implementation of SCP education programme plan presented above should be inclusive, meaning that relevant stakeholders are engaged at each stage to ensure that the interests and concerns of all affected by SCP education decisions are adequately taken into consideration. In the proposed strategic approach, three levels of organisational decisions and processes could be distinguished, namely strategic, functional and operational levels. Accordingly, roles and responsibilities of stakeholders have to be identified and communicated. Further, the implementation of the SCP education programme plan for a particular level/area of education essentially requires the development of relevant curriculum, teaching/learning materials and other resources. This aspect will be deliberated in the second deliverable of this project component. Some of the tasks listed in Figure 2.2 basically represent broader topics. More details of these tasks are presented in Chapters 3, 4 and 5, and the specific activities proposed to accomplish these tasks are briefed in the following section. These specific activities have been selected for the process of formulating a nationally appropriate ESCP programme plan suitable for local contexts, while giving due consideration to the related global experiences on the topic, including ESD.

2.2.2 *Description of Activities and Sub-activities*

In line with the methodology proposed above, following key activities and sub-activities have been identified for the successful accomplishment of the tasks:

- *Activity 1: In Country Situational Analysis*
  - Sub-activity 1.1: Collection of literature on curricula and associated information on SCP and related subject areas such as Cleaner Production, Energy Management, Environment Management, etc. already developed and implemented in Sri Lankan University system covering undergraduate, postgraduate and CPD programmes.
  - Sub-activity 1.2: Consultations/Meetings with relevant resource persons to complement the task in item 1.1 above.
  - Sub-activity 1.3: Repeat the item 1.1 for education systems in Sri Lanka other than Universities (school and tertiary).
  - Sub-activity 1.4: Consultations/Meetings with relevant resource persons to complement the task in item 1.3 above.

Sub-activity 1.5: Conduct inception workshop for representatives from relevant agencies/educational specialists to brief the project and present the preliminary findings of item 1.1 and item 1.3.

Sub-activity 1.6: Synthesize the information gathered through the sub-activities 1.1 to 1.5 above and prepare a report.

- *Activity 2: Situational Analysis on Regional & International Initiatives*

  Sub-activity 2.1: Collection of literature on the progress of the education in SCP (and related subject areas) in Asia Pacific, Europe and the rest of the world.

  Sub-activity 2.2: Consultations with relevant experts/resource persons locally and internationally to complement the task in item 2.1 above.

  Sub-activity 2.3: Synthesize the information gathered in the sub-activities 2.1 and 2.2 above and prepare a report on regional & international initiatives on the progress of the education in SCP.

- *Activity 3: Appraisal of Project Experiences*

  Sub-activity 3.1: Collection of literature on similar projects initiated by international organisations such as SWITCH-Asia Project, UNEP, UNITAR, UNESCAP, etc.

  Sub-activity 3.2: Prepare a review based on the information collected in item 3.1 above on the appraisal of project experiences.

- *Activity 4: Advice & Consultation of Decision Makers*

  Sub-activity 4.1: Consultations/Meetings with relevant key governing bodies in educational systems in Sri Lanka such as Consult Ministry of Education, Ministry of Higher Education, University Grant Commission (UGC), National Institute of Education (NIE), National Apprentice and Industrial Training Authority (NAITA) to obtain advice on the theme.

  Sub-activity 4.2: Synthesize the feedback obtained through the task in item 4.1 above and extract the significances (i.e. recommendations/ opinions/ arguments/ facts).

- *Activity 5: Stakeholder Consultation*

  Sub-activity 5.1: Conduct series of meetings with other key stakeholders and decision makers to gather their views and suggestions.

  Sub-activity 5.2: Prepare a review report to present the outcomes of the tasks in items 5.1 above.

- *Activity 6: Development of a Comprehensive Strategy*

Sub-activity 6.1: Analyse critically the information gathers in Activities 1 to 5 above.
Sub-activity 6.2: Based on the analysis of the task in item 6.1, make recommendation to establish a comprehensive strategic plan for the SCP Educational Programme in Sri Lanka.

- *Activity 7: Validation of the Strategic Plan*
  Sub-activity 7.1: Conduct consultative workshop with representatives from relevant agencies to validate the strategic plan of SCP Educational Programme.
  Sub-activity 7.2: Conduct series of meetings with relevant officials to complement the task in item 7.1 above.

- *Activity 8: Finalisation of SCP Educational Programme Plan*
  Sub-activity 8.1: Based on the findings of the above activities, prepare the SCP Educational Programme Plan for the educational system in Sri Lanka.

2.3 Implementation Strategy

2.3.1 Overview

The process of implementation usually begins with the formal adoption and launch of the SCP education programme plan. However, as the active participation and commitment by key stakeholders of the education sector throughout all stages of the strategic planning process are important, it is advisable to obtain high-level commitment and endorsement by the decision makers at the appropriate stages in prior, depending upon government processes and the political context. There are different forms of commitment, such as voluntary initiatives, formal agreements, ministerial directives, etc. One possible approach to communicating the relevance of the SCP education programme plan to decision-makers and ultimately to enhance commitment and cooperation is to highlight where several national goals (particularly related to SDGs) could be served by the proposed SCP education strategy and also to enlighten the interlinks with their sectoral challenges. Further, generating support and commitment among decision-makers outside of government, such as private schools, universities and other educational institutes, environmental advocates, and community leaders, is also important.

The launching of the SCP education programme plan should be accompanied by an appropriate awareness-raising and communication campaign; firstly among stakeholders in the education sector including students and teachers and among other related sectors in the government, followed by the wider community/general public. The stakeholder awareness-

raising could be realised through initial meetings, high-level communications, seminars, information sharing, mass media and other outreach activities.
The other activities to be performed for effective implementation include the following:

- Resource allocation & mobilisation
- Sustain momentum
- Regularization.

2.3.2 *Resource Allocation & Mobilization*

Reorienting educational efforts towards SCP fundamentally reflects a transformative approach to education, involving changes to curricula, innovative teaching and learning, and whole-of-system engagement. Such radical changes demand a variety of new tools, skills, knowledge, information and learning environment across all related forms of education at different levels. Lack of such resources would be a major hindrance to the successful implementation of the strategic plan proposed. Accordingly, resource enhancement and mobilisation to fill the gaps between desired levels against existing levels become an integral part of the strategic plans and should be reflected in activities/tasks. These include capacity building and mobilisation of individuals, groups, organisations, institutions and country as a whole, which refers to the development of their abilities, individually and collectively, to perform functions, solve problems and achieve objectives in the SCP education.

Another essential resource requirement for effectivity of SCP education programme plan is information. Provision should be made within the strategic plan to establish an information management system of most-recent, adequate, reliable, understandable, scientific information not only for the development of educational materials but also to assist policymaking, planning and decision-making, together with access to all other stakeholders including the general public through the most appropriate means. Such a system could also be considered as the capacity of the country to access and collect data, which is a fundamental requirement for the monitoring and evaluation of the progress of activities and impact assessments.

2.3.3 *Sustain Momentum*

Once the programme commences and advances, there is a high possibility that the initial surge of energy, commitment and interest get diminished. Hence, emphasis should be given to incorporate some means for maintaining the momentum. One way to retain the political support is to ensure some short-term tangible and politically appealing results. Concentrated efforts on a manageable number of specific priority issues capable of illustrating continuous progress and delivering expected outputs would be another approach. In addition, it may be relevant to consider the shifting of responsibilities in certain actions as they progress, since the resource, capacity and skill requirements could be evolved with the changes in the background situations and/or different stages of activities/tasks.

Further, performance appraisal, recognition and rewarding of specific work or process that support the goal and objectives of the SCP education programme plan by ministries or institutions too could play an important role in sustaining the momentum of the programme. This is an effective way to focus the educationalist, educational institutes and their people (students) on improving their performances as determined by the relevant indicators and will help to keep them encouraged and motivated.

2.3.4 Mainstreaming ESCP

Although many nations around the world have accepted the importance of ESD as well as ESCP, only limited progress has been made on any level due to the presence of a variety of barriers, as highlighted in the literature. Understanding these critical barriers in the planning stage and introducing relevant interventions to mitigate them would help to mainstream ESCP within education sector more effectively. Some of the key challenges requiring such interventions on a priority basis are listed below [8]:

- Limited awareness on SCP among the educational community and the general public
- Restructuring and placing SCP in the curriculum
- Linking to existing issues such as country's need for rapid economic development
- Complexity of the concept of ESCP itself
- Community/stakeholder participation
- Engaging traditional disciplines in a transdisciplinary framework
- Sharing the responsibilities
- Capacity building
- Developing financial and material resources
- Developing policy
- Developing a creative, innovative, and risk-taking climate
- Promoting SCP in popular culture.

2.3.5 Monitoring and Evaluation

The progress assessment could be used as a tool to monitor (i.e. formative assessment) the advancement of the tasks and activities and to evaluate (i.e. summative assessment) their results/achievements/impacts in order to create information for proper designing, implementing, reviewing and updating the SCP education programme plan. Further, monitoring and evaluation increase the accountability of various stakeholders by serving as checks and balance. Thus, monitoring and evaluation serve as a control mechanism and could be used as a part of a continuous improvement process, which is a fundamental part of an effective planning [9].

The monitoring and evaluation of the SCP education programme plan are recommended to be based on sound statistical information, and could be comprised of the following elements:

- Develop monitoring and evaluation protocol (including data/information collection instruments and quality assurance schemes);
- Pre-test the protocols;
- Collect data/information/lines of evidence (both qualitative and quantitative);
- Continual monitoring;
- Assess progress against targets;
- Independent evaluation.

2.3.6 *Review and Update*

When the SCP education programme plan is in implementation and its activities are in progress, needs arise to adjust it to changing circumstances, reviewing it for potential changes or possibly updating it completely, depending on the context. In particular, during implementation, there would be a progressive development of expertise, generation of knowledge and capture of data and information, allowing the key stakeholders to make more informed decisions. In fact, updating the strategy should be an outcome of the monitoring, evaluation and re-assessment processes. This would provide a way for systematically documenting the current status of the national situation in relation to SCP education sector, including policy, administrative, infrastructure, technical (including curricula) and organisational aspects. It also can provide a useful basis for a national dialogue to revisit national needs and priorities in education, and also explore the global developments ESCP. As with earlier stages, the review and update of the plan could be realised through the step-wise process, for example:

- Assessment of progress and success;
- Analysis of data and information;
- Replicating success and learning from mistakes;
- Analysis of external environment;
- Reformation of the plan.

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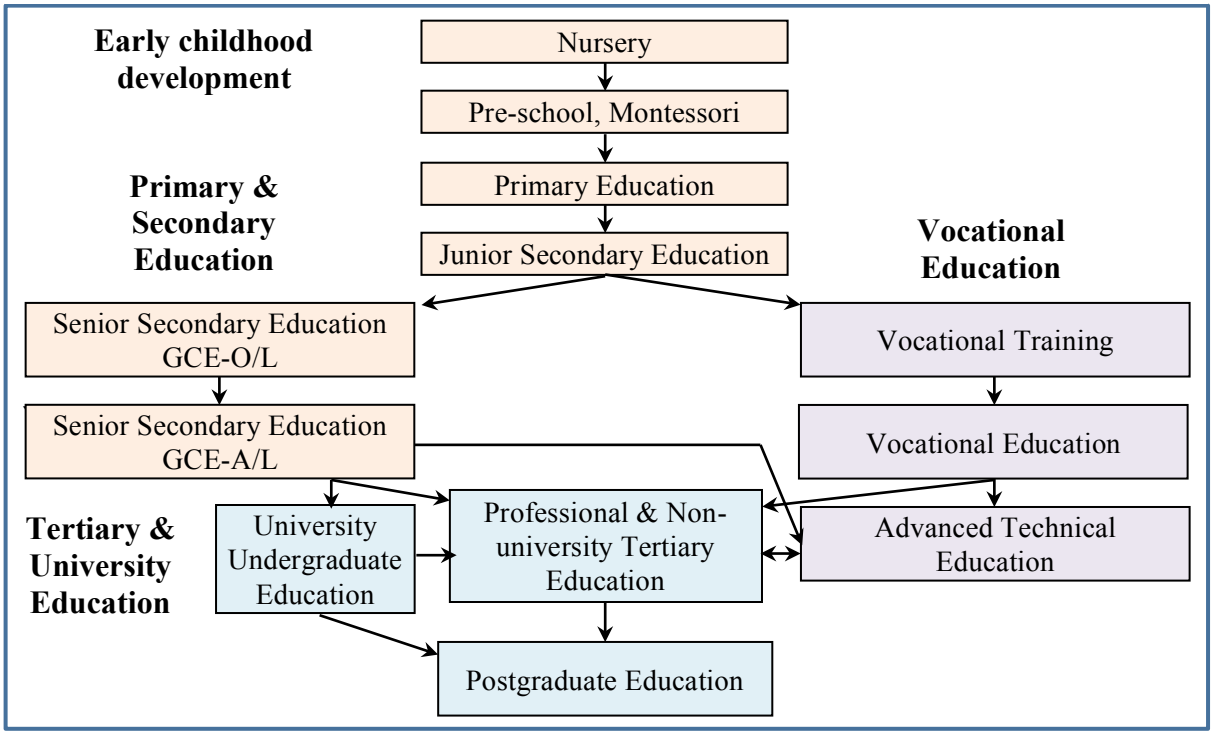
3 In Country Situation Analysis

3.1 Education System in Sri Lanka – An Overview

Sri Lanka has achieved a significant progress in education compared to many other developing countries, as signified by basic education indicators. The base for this is the government policy of providing free education from the primary stage to the first degree level of university education. There is a network of schools all over the country, even covering very rural areas. The resources for the government schools and the payments for the teachers are a responsibility of the government. The general education span is of 13 years from age 5 to 18 years. This is classified into three levels as Primary schools (Grade 1 - 5, Age 6 - 10); Junior secondary school (Grade 6 - 9, Age 11 - 14); Senior secondary school or General Certificate of Examination GCE- Ordinary Level (Grade 10 - 11, Age 15 - 16); and Collegiate or GCE Advanced Level (Grade 12 - 13, Age 17 - 18). At present education is compulsory up to 14 years. A policy decision has been taken to increase the upper age limit to 16 years. Those who successfully completed the GCE-A/L are eligible to join universities or tertiary institutes for higher education and those who leave schools have opportunities in vocational training. Accordingly, the different stages of education can be classified as:

- Early Childhood Care and Education.
- General Education (school education).
- Tertiary and University Education.
- Technical and Vocational Education.

Box 3-1: Formal education system in Sri Lanka [1]



General organisation structure of the education system in Sri Lanka has been presented in Box 3.1 above.

Presently there are over 10,000 schools (4 million students) in Sri Lanka, which included over 9,900 government schools and about 100 recognised private schools. In addition, there are about 300 international schools, which prepare students for foreign examinations. The schools administered by the Ministry of Education of the central government are designated as national schools and other schools administered by the provincial councils as provincial schools. The number of national schools is 342 and the balance come under the provincial councils. For the education of Buddhist priests, there are about 750 monastic colleges (Piriven). These have been the centres of secondary and higher education from ancient times. The number of degree awarding institutes includes 23 universities and 28 institutes. At the higher education level, the University Grants Commission is the primary university administrator responsible for allocating funds, maintaining academic standards, and regulating university admissions. The Department of Technical Education and Training, under the Ministry of Youth Affairs and Skills Development, oversees non-university higher studies, while the Ministry of Higher Education sets policies and oversees the broader tertiary education system as a whole. Apart from the formal education system highlighted above, there are other means of learning and capacity building. For professional level educations, several institutes and organisations conduct Continuing Professional Education (CPE) or Continuing Professional Development (CPD) programmes in various disciplines. Other less-structured forms of education also contribute to knowledge transfer, which is referred to as non-formal and informal educations. The importance of these forms of education has been well-recognized globally, and there are initiatives to develop competency measuring frameworks for evaluation [2].

More details of these forms and levels of education systems in Sri Lanka, especially with regards to SCP education, are presented in the following sections.

3.2 SCP related Education in Sri Lanka

3.2.1 Overview

As SCP includes themes covering many disciplines and diverse subject areas related to global issues and related aspects, some of the topics have been already progressed into the education systems in Sri Lanka. These include, but not limited to environment, waste, energy, poverty, sustainability, sustainable development, resource efficiency/management, cleaner production, climate change, hazardous chemicals/waste, health impacts, food security, water security, life-cycle-assessment, etc. However, in general, most of the subjects/programmes have been limited to a particular area of study and system approach and interdisciplinary aspects have not been addressed adequately. Nevertheless, the importance of these topics has been well accepted and the need for further enhancement is much spoken.

Among the topics listed above, most progressed area of study is the environment. The environment education has become a common topic across all the forms and levels of education and embedded into formal curricula. Presently, the subject is addressed from pre-schools to undergraduate and postgraduate study programme, as part of a subject, a specific subject and specific study programmes. Subsequently, with the emergence of energy issues, the subject has surfaced as an important topic of education and knowledge. Now energy topic has been introduced to school curricula as a part of the science subject in secondary education. The topic of conservation of natural resources has also transpired with the progression of both environment and energy studies, where terminologies such as "environment management", "energy conservation", "air quality" and "waste management" frequently appear in the media and used by the mass.

The topic of resource efficiency/productivity (and energy efficiency) was mainly articulated in the industry, and subsequently, cleaner production concepts have been evolved. Several national level programmes and CPD courses in these areas have been conducted, notably by National Cleaner Production Center (NCPC), Sri Lanka Energy Managers Association (SLEMA), Sri Lanka Sustainable Energy Authority (SLSEA), Institute of Engineers Sri Lanka (IESL) and National Productivity Secretariat (NPS).

3.2.2 Early Childhood Education

Early childhood education usually refers to the age duration of 0 to 5 years, prior to the primary education. Considering its importance to the lifelong education, the government has prepared a National Policy on Early Childhood Care and Development (ECCD). According to this policy, though the policy guidance and standards is the responsibility of the central government, the provincial councils are responsible for regulating the pre-school. Up to age 3 (infancy stage), the responsibility lies with Ministry of Health for primary health care and the balance period of age 4 to 5 years is the preschool stage. There are about 17,000 preschools and day-care-centers in the country [2]. Though there are certificate awarding institutes for the training of preschool teachers, there is no proper institutional mechanism for quality control or curriculum development. The level of environment-related education is not very prominent and the main contribution to related education probably comes from parenting/family and community involvement. Thus the lack of awareness on SCP principles and concepts among the parents (as the general public) has a prominent effect, further to the similar situations with the preschool teachers.

In response to these issues, a number of programmes have been developed and implemented by, for examples, Central Environment Authority (CEA) on environment education, SLSEA on energy education, Children's Secretariat on home gardening and NPS on green productivity targeting preschool teachers. However, these programmes have not been mainstreamed in the sector and conducted only when requests come. Figure 3.1 illustrates the educational materials (story books) developed by SLSEA on sustainable energy topics [3].

Figure 3.1: Energy educational materials for training of preschool teachers

The main segment of the formal education represents the school education from Grade 1 to Grade 13 (age 6 to 18 years). Broadly there are two main divisions in this period: first five years of primary school and next eight years from grade six to thirteen of secondary school. In the primary school, an integrated curriculum is offered based on the following four subjects:

- Language (mother tongue)
- Environment related activities
- Mathematics.
- Religion

Activity-based oral English is introduced through environment-related activities [1]. Presently no specific activity is offered on SCP related topics, though the subject of environment is a common topic usually discussed through outdoor activities/engagements. The basic principle of the curriculum is to have an integrated, interdisciplinary approach, than teaching individual subjects in isolation, there is sufficient opportunity for inculcating the underpinning principles and concepts of SCP. However, lack of human capacity, physical resources, drive and assistances may have contributed to the slow uptake.

CEA has implemented ECO Club programme targeting this stage of for environment education. Presently, there are about 2,700 schools of having Eco Clubs [4]. Although the majority of schools still do not establish Eco Clubs, it is a very promising arrangement as an entry point for SCP education into the primary education sector.

The secondary school curriculum is basically subject based, but the links are expected to be maintained through horizontal integration. The secondary education is further classified into three levels. The Junior Secondary level runs from Grade 6 to Grade 9. The curriculum at most public schools includes the following:

- First language (mother tongue)
- Second national language
- Health and physical education
- Practical and technical skills
- English
- Mathematics
- Social studies
- life competencies and aesthetic studies

Students are assessed through a series of school-based exams, projects and practical work. This stage is followed by the Senior Secondary stage, the curriculum of which includes most of the subjects covered at the junior secondary level, but with the addition of some technical subjects such as:

- Woodwork
- Agriculture
- Home economics

Upon completion, students can finish their secondary schooling in one of the four main A/L streams:

- Arts
- Biological Science
- Commerce
- Physical Science

Typically, students will take three subjects linked to their stream, and these choices will have a strong bearing on the programme of study that they will pursue at university. The subject areas and specific subjects offered during Secondary School education, as given above, exemplify the relevance of SCP related topics to the scope of the subjects. Particularly, the environment and energy related topics are covered as parts of the formal curricula during this stage of the study.

Further to the formal curricula, some significant activities relevant to the education of SCP related topics could be identified. One such programme is the Environment Pioneer Programme (EPP) implemented by CEA (for Grade 6 to Grade 13) as a component of their environment education programme. Annual promotional programmes, including medal award ceremony for best achievers, are conducted for the motivation and recognition of the students and staffs involved (Figure 3.2).

Figure 3.2: Energy educational materials for training of preschool teachers

Another one is the School Energy Club (SEC) programme implemented by SLSEA (Grade 6 and above). SEC has been established in 2,500 schools covering each and every willing school in the island flourishing the "Energy Education Programme" which had been

inaugurated within the government school system since 2015. Ministry of Education has issued a circular for all the science teaching schools to establish energy clubs to assist the related topics in the science subject in the curriculum (Box 3-2). This programme implements a vast range of activities to enhance knowledge of energy, attitudes, and related skills of children of the nation. Three competitive programmes, namely 'Energy Star', 'Energy Day' and 'School Energy Clubs' (Box 3-2).

Box 3-2: Energy Club programme implemented by SLSEA [5]

School Energy Clubs (SECs)

The national education programme - "School Energy Clubs (SECs)" was inaugurated within the government school system in 2015. Presently SECs have been established in 2,500 schools covering each and every willing school in the island flourishing the "Energy Education Programme". This programme implements a vast range of activities to enhance knowledge of energy, attitudes, and related skills of children of the nation. There are three competitions associated with this programme to reword the successes, namely 'Energy Star', 'Energy Day' and 'School Energy Clubs' are implemented within the school system under this programme as per the circular ED/01/14/07/06 issued by the Ministry of Education on 30th April 2015.

SEC Logo

Both the programmes highlighted above are potential entry points for the SCP education plan programme for the secondary education sector.

3.2.4 University Education

There are over 600 undergraduate degree programmes offered by 51 universities and degree awarding institutes in a wide range of disciplines [6]. Distribution of key categories of disciplines is presented in Figure 3.3.

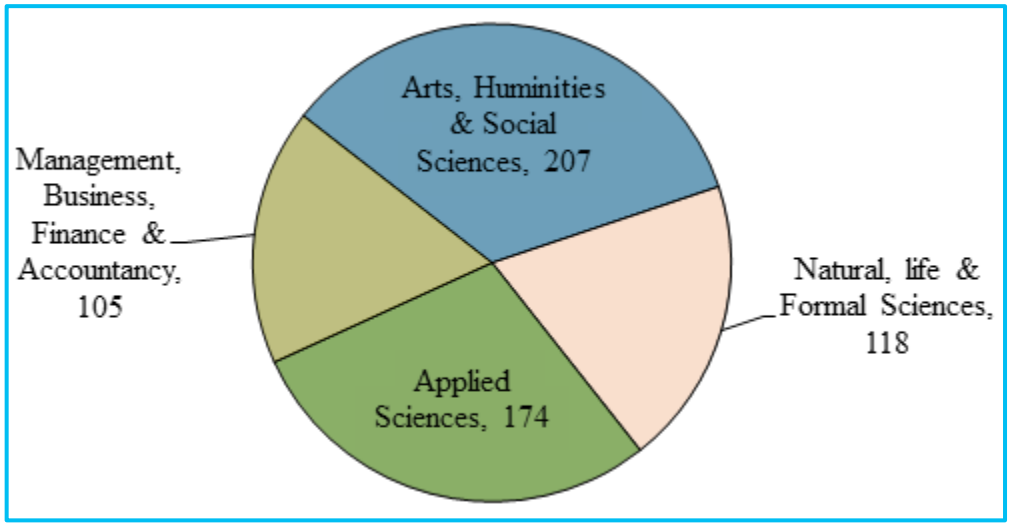


Figure 3.3: Number of degrees offered under different disciplines

In terms of progression of the SCP related education in Sri Lanka, the University sector is leading, having related subjects included in the curricula in most of the degree programmes offered. The topics covered include areas such as environment, energy, health, lifestyle, sustainable development, cleaner production, sustainable built environment, but not specifically on SCP. In the majority of the cases, the SCP related topics are introduced either section within other related subjects or as new optional/elective subjects. Among the university degree programmes, the progress is more prominent in Engineering and Science disciplines. Specifically, some the scope of some degree programmes, both undergraduate and postgraduate level, are on SCP related topics, particularly on environment management, as reflected in the title of the degree programme itself, Table 3.1 presents some examples of undergraduate degree programmes [6].

Table 3.1: Undergraduate degree programme related to SCP

University	UG Degree Programme
University of Colombo	BSc in Environment Science
University of Sri Jayawardenepura	BSc in Forestry & Environmental Science
University of Kelaniya	BSc in Environmental Conservation & Management
University of Ruhuna	BSc in Green Technology
Rajarata University	BA in Environmental Management
Sabaragamuwa University	BSc in Environmental Sciences and Natural Resources Management
Vavuniya Campus	BSc in Environmental Science
University of Ruhuna	BSc Engineering specialised in Civil & Environmental Engineering

In particular, the Green Technology programme offered by Faculty of Agriculture, University of Ruhuna has higher relevancy to SCP. The key subjects in the curriculum of this programme are presented in Box 3.3.

Box 3-3: Subjects offered in BSc Green Technology programme

Thematic Area 1: Sustainable Resource Management (SRM)			
Natural Resources of Sri Lanka	Conservation Principles	Efficient Use of Natural Resources	
Environmental Sociology	Environmental Pollution	Human Resources Management	
Laws and Regulations with respect to Natural Resources and Pollution Prevention			
Thematic Area 2: Sustainable Environmental Design (SED)			
Land Use Planning	Environmental tools	Environmental Economics	Project Planning
Wildlife and Biodiversity		Climate Change	Carbon Crediting
Thematic Area 3: Sustainable Environmental Technology (SET)			
Wastewater Management	Solid Waste Management	Cleaner production	
Emission Control	Product Processing	Quality Management	Indigenous Technology
Thematic Area 4: Sustainable Energy (SE)			
Energy and Development	Renewable Energy Sources	Energy Analysis and Management	

Table 3.2 presents some postgraduate degree programmes on SCP related subject themes.

Table 3.2: Postgraduate degree programmes related to SCP

University	PG Degree Programme
University of Colombo	MSc/PG Dip in Climate Change and Environmental Management
University of Moratuwa	MSc / PG Diploma in Environmental Management
	MEng/PG Dip in Energy Technology
	MSc in Sustainable Process Engineering
University of Sri Jayawardenepura	MSc/PG Dip in Forestry & Environmental Science
University of Kelaniya	MSc in Biodiversity and Integrated Environmental Management
University of Ruhuna	MSc in Green Technology
University of Peradeniya	MSc in Biodiversity, Ecotourism and Environment Management
Open University of Sri Lanka	MSc in Environment Science

Introduction of SCP related subjects is more prominently evident in recently introduced degree programme, and the topic is emerging as specializations in Undergraduate and postgraduate degree programmes.

In addition to above, all universities offer research degrees, conduct research programmes and offer specific CPD programmes directly related to the key areas of SCP.

3.2.5 Technical and Vocational Education

Vocational and Technical Education in Sri Lanka commenced with the establishment of the Government Technical College in 1893 in Maradana, initially to train the blue collar personnel to run the Railways and the Tea Factories. This sector of education was neglected for many years, having many institutions involved in this sector. However, in the recent past, there have been several initiatives and sectoral changes to improve this situation and now, there is a much improved overall institutional structure, governance management, particularly with the introduction of the National Vocational Qualifications (NVQ) system. The NVQ framework consists of seven levels of instruction in three categories of professions.

Although the institutional mechanism and infrastructure facilities for delivery of Technical & Vocational education is in place, there are issues on effective delivery, mainly due to lack of properly trained staff in the relevant trade fields, with exposure to the new and emerging subject areas such as SCP. Therefore, the incorporation of SCP related topics into the curriculum is still not evident. However, the situation is improving, and major curriculum revisions are being introduced. For example, the University of Vocational Technology (UNIVOTEC) offers a number of BTech degree programmes, where topics such as environment conservation and management, renewable energy, energy conservation, green

built environment are included in the curricula. Still, there is a major requirement to revise and update the curricula in many other courses.

3.2.6 Continuous Professional Development

Another important sector of education is the Continuing Professional Education (CPE) or Continuing Professional Development (CPD). This is a process of continuing education to maintain and upgrade knowledge and skills in different professions. Most professions have CPD obligations. Presently, a broad range of CPD programmes is across all the disciplines by many training institutes and organisations. Depending on the requirement and relevancy, SCP related topics are covered in some CPD programmes, particularly for a technical professional in the industry. CPD programmes are mainly conducted by Universities, government research institutes (such as Tea Research Institute – TRI, Coconut Research Institute – CRI, Rubber Research Institute – RRI, National Engineering Research & Development Center _ NERDC) and professional organisations (such as Institute of Engineers Sri Lanka – IESL, SLEMA, NCPC).

Box 3-4: Two CPD programmes offered by NCPC

With regards to SCP related CPD programmes, NCPC is the pioneering /leading service provider in the country, particularly on cleaner production. NCPC provides training and awareness in several other related areas, such as Life Cycle Analysis, Eco-design, Eco-

innovation, Environmental management and accounting, Responsible care and responsible production (Box 3.4) [7].

The present capacity and framework of the delivery of CPD programmes indicate that one of the most effective ways for SCP education would be through CPD programmes, where the target group is professional in different disciplines.

3.2.7 Other: Non-formal & Informal Education

In addition to formal education and training, learning through exposure and experience has considerable effects on one's knowledge, skills and attitudes that are acquired on a lifelong and life-wide basis. Under these circumstances, non-formal and informal education means are expected to play a vital role in SCP education. This area of education is more important to the sectors of the population who do not have access to the formal education system, including those of early childhood. CEA Media plays a vital role on this category of education.

There are many examples of non-formal & informal education/learning in Sri Lanka. One classic example is health education for the mother, particularly during pregnancy to infant ages (up to three years). In general, government agencies have dedicated branch or staff for awareness and education in their subject field. For examples, CEA has "Environment Education Division" and SLSEA has "Knowledge Management Division", where in each case, a team of dedicated staff, headed by the Director, is working full time on awareness and education to all the sectors of the society. They also conduct special training programme for media personnel on energy and environmental related themes. Ministry of Education also has a special branch on non-formal education.

3.3 Conclusions

SCP is not yet a well-established theme/subject of the education system in Sri Lanka. However, several key topics of SCP have been introduced in all the sectors and levels of education in different intensities. Traditionally, environment education is part of the formal education system from primary schools to Universities. Another common subject area is energy resources and management. These topics have been introduced into the curricula in different ways. Most common one is the inclusion of the topics into existing subject content. In some cases, new dedicated subjects are introduced (either as optional or compulsory). In University level, even dedicated degree programmes have been introduced (though limited), both as an undergraduate degree and postgraduate degree. Almost all the university degree programmes include these topics in the curricula, but the topic of SCP is still not prominent. They also offer CPD programmes in related subject areas, particularly to the industry. Technical and Vocational education programmes have also incorporated similar subjects into the curricula, though not prominent as those of universities

Further to the formal education system, there are several successful education programmes implemented by several organisations, for different target groups. For examples, EPP and

Eco Clubs in schools by CEA and SEC by SLSEA have provided more opportunities (outside the curriculum) for the school children to learn sustainability concepts. Although early childhood education is not a part of the formal education system, both CEA and SLSEA implement pre-school teacher training programmes on environment and energy areas, respectively. Some non-formal education programmes such as Scouts have also introduced environment and energy education as components of their educational activities.

In the recent past, a number of new programmes has been initiated by several institutes to promote environment education. In a number of universities, specific undergraduate and postgraduate programmes have been initiated related to above areas, and new subjects are being introduced in many degree programmes. In particular, expansion of degree programmes in the Universities and also curriculum revisions associated with local/international accreditation and quality assurance schemes pose new opportunities to introduce sustainability-related subject topics. Similar opportunities are seen in technical and vocational education due to the upgrading of the courses. There are opportunities in CPD and non-formal educational programmes. However, lack of human resources and expertise (educationalist) has hindered the progress, except for university system in general. Even in schools, the capacity of the teachers in the areas of energy and energy is limited.

In conclusion, the SCP education is vital for inclusive socio-economic development in Sri Lanka. For the successful implementation of SCP education plan, a conducive environment has to be established with adequate human and physical resources with right governance and management system.

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4 Situational Analysis on Regional and International Initiatives

4.1 Overview

The age-old conflict between economic development and environmental protection has impinged the progress of the world economy in the past few decades. While the arguments put forth in the support of either of the two seem genuine, it has also been accepted that these two cannot function alone. To this end, the concepts of cleaner production (CP) and sustainable development (SD) emerged gradually as practical approaches to ensure that overexploitation of resources is avoided in order to meet the need of the present and that waste management and pollution control are incorporated from the very beginning of the project cycle. Taking a step further, sustainable consumption and production (SCP) have now been seen as critical innards of sustainable development, as well as a framework for incorporating various facets of sustainability into the mainstream of economic development.

The chronological evolution of the concepts of CP, SD and SCP has been shown in Figure 4.1. It was at the United Nations Conference on the Human Environment held in Stockholm, Sweden in 1972 that first discussed the transboundary implications of environmental issues and impacts of industrialisation. The conference led the way in drafting a Declaration that contained action plans and principles to preserve and enhance the human environment, although most of the plans were 'end-of-pipe' based options. In fact, in the 70s and early 80s, energy and pollution were usually considered separate issues. For example, the increase in oil prices, development of renewable energy resources and technologies, and promotion of energy efficient technologies were the concern of energy specialists, while pollution generation and disposal were tackled by environmental engineers and scientists. Environmental pollution issues were generally addressed by dilution of pollutants, and later through control and prevention methods. Although the CP approach seems logical and obvious, its implementation in the industrial sector only began in the early 80s. CP can be understood as an industry-specific, preventive environmental initiative to minimise waste and

Figure 4.1: The evolution of concepts of CP, SD and SCP

emissions while also maximising product outputs [1]. In response to increased environmental pollution problems, industries had taken many CP initiatives and there exist numerous case studies demonstrating the benefits. As a result, CP concepts have become the cornerstone for industrial pollution management. Both UNEP and UNIDO played an important role in promoting the CP activities in the Asia and the Pacific region, and most of the activities were driven by the creation of CP centres since 1994.

However, capacity building in CP was designed and implemented either on an ad-hoc basis or was focused on training only the specialists. Generally, industries served as "training centres" for developing the skills of industrial workers and entrepreneurs. The training and experience thus acquired enable them to branch out to other fields. The informal, on-the-job type of training was usually not well organised. In addition, CP training had tendencies to concentrate on reduction of wastewater, solid waste and air emissions and could not add much value to the capacity of graduates of traditional graduate level programmes that offered environmental engineering or in environmental sciences with a curriculum based on end-of-pipe systems. In wastewater treatment, most courses dealt with major environmental impacts, various types of treatment systems like physio-chemical treatment, biological treatment and advanced treatment systems (e.g. membrane systems). All these courses trained users to operate treatment systems to reach required effluent standards. Solid waste management courses dealt with problems related to solid waste treatment systems (separation, recycling, stabilisation and incineration) and disposal methods (landfilling). Air pollution management courses dealt with causes of air pollution, monitoring and control. Energy curriculum in universities responded to the energy crisis of the 70's and early 80's by offering courses related to renewable energy resources (solar, biomass, wind) and their use, energy conservation principles and practices in industries, buildings and processes, and energy policies, planning and economics. Training for industry professionals and others on issues related to energy conservation had been ongoing for more than two decades and offered energy audit methodologies to specific industrial sectors. During the late 80's and in the 90's, the impact of energy use on global pollution and climate change was recognised and studies on the interrelation between energy and environmental issues were initiated.

At the same time, the inter-sectoral conflict between environment and energy sectors also did not help the cause of establishing CP in the mainstream. Utility agencies were generally responsible for generation and distribution of power. Most energy conservation laws did not enforce regulations on high energy consumption, except perhaps by fining defaulters. Environmental regulators could only prosecute industries that did not meet emission standards but could not prosecute for high energy consumption. Similarly, environmental regulations were based on effluent or emission standards which dealt with end-of-pipe or pollution control technologies. These standards did not require an industry to operate more

efficiently in terms of the amount of pollution generated or adopt cleaner production technologies. Different professions with two distinctly different objectives conducted energy and environmental audits. It was thus soon realised that it would be useful to integrate environment and energy components to maximise the benefits. As such, along with energy audits, industries started conducting environmental audits to identify potential pollution prevention options. As a follow-up to these energy and environmental audit programmes, many national governments started developing energy and environmental labelling programmes. These programmes are considered benchmarks for many industrial processes and consumer products. This led to the concept of total quality management or preventive environmental management, which involves all these considerations in industrial production. Beyond this lies the domain of a holistic, integrated management system embodied in ISO 14000 standard series and the idea of sustainable development which incorporates all aspects of environment and production.

In 1987, the concept of Sustainable Development (SD) was introduced in a report (also called Brundtland Report) on the state of the environment for the UN World Commission on Environment and Development. In this report, SD was defined as, “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. By the early 1990s, it was becoming clear that quantity and quality of waste and the amount of energy consumed were as important as the products themselves and should be minimised to mitigate adverse environmental impacts. Environment professionals started introducing concepts of waste minimization and CP to reduce the treatment charges attached to discharge and foster sustainable production. Because pollution prevention requires a sound understanding of industrial unit processes, chemical engineers got involved in environmental activities.

The concept of SD was further discussed during the UN Conference on Environment and Development in 1992 in Rio de Janerio. In this conference, a document entitled ‘Agenda 21’ was drafted that set goals by facilitating countries to tailor-fit its specific needs in order to smoothen its path to attaining SD. It gave profound implications for industrial policies and industrialisation patterns in developing countries and gave rise to a new paradigm where nations were encouraged to decouple economic growth from the deterioration of the environment. Additionally, Agenda 21 acknowledged the imbalances in consumption and production pattern between income groups and among countries at different economic capacities. It specifically called for a “multi-pronged strategy” to attain SD across the globe and end the disparity in the consumption patterns between the rich and the poor.

Gradually, the concept of SD was inculcated in the formal education ranging from secondary level to undergraduate and graduate programmes. In this approach, students were exposed to

environmental problems that moved from one part of the product life cycle to another, for example from a processing company to the customer of the company. As such, environmental considerations were expanded to life cycle or "cradle to grave" perspectives. The undergraduate curriculum started incorporating energy efficiency, pollution reduction and prevention, eco-design and manufacturing, environmental management concepts into the existing curriculum. Courses such as heat transfer, mass transfer, wastewater treatment and industrial management were appropriately revised to enable students to confidently approach the present day problems in their professional careers. At graduate levels, specialised courses on CP production were being offered which could take a multi-disciplinary approach and SD concepts could be covered in depth. The description of an integrated course on CP principles dealt with important aspects of pollution prevention and energy efficiency options [2]. Courses integrating issues related to processes and products were then felt to be useful to personnel from industries, consultants and others involved in the production process.

Slowly, with time, the so-called 'rebound effect' came to the fore. Most of the sustainability and momentum gains of the Rio Conference were unable to pre-empt the severe impacts of increasingly unsustainable patterns of consumption and production. As the focus shifted towards sustainable production, the products became more efficient and cheaper and the consumption pattern took a toll as people could buy more products, often without considerate thought or expense [3]. The emphatic changes in consumer behaviour could also be attributed to the knowledge-action gap in which either the consumers were unaware of the sustainable consumption practices or were unable to implement the same, despite being informed, as the

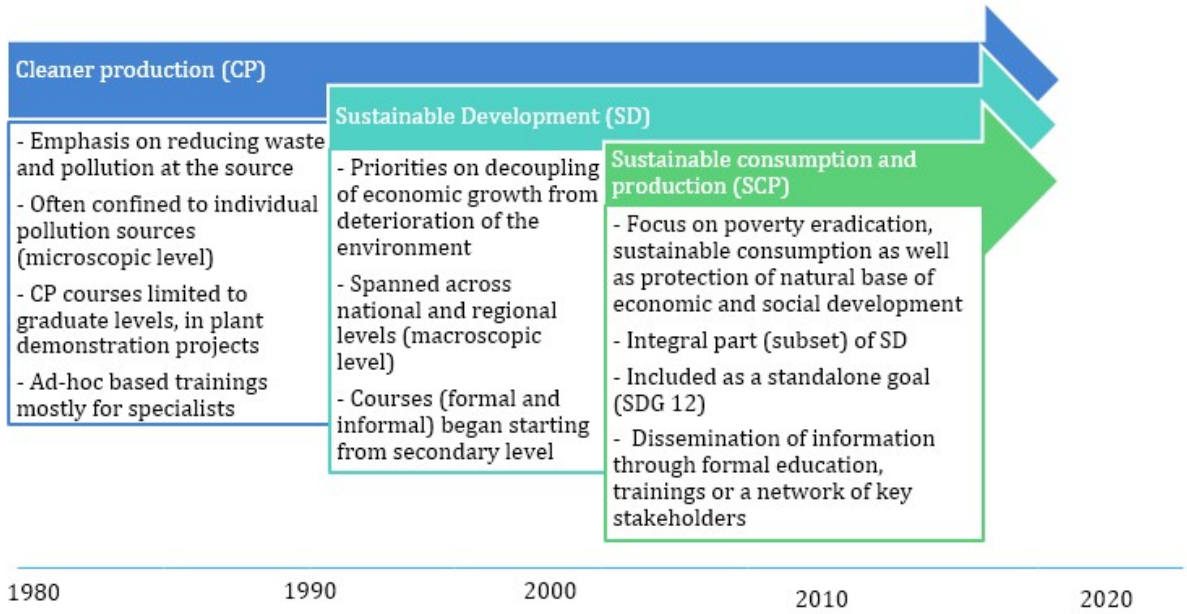

Figure 4.4: Key changes during the progression of CP, SD and SCP

alternatives were unavailable or unaffordable. Most of this was even attributed to the lack of implementation, or translation into action, of the policies and plans that were agreed on paper. This led the way to articulate a more strategic and integrative approach to addressing production-consumption systems, and thus the concept of sustainable consumption and production (SCP) was introduced.

As defined by the Oslo Symposium in 1994, sustainable consumption and production (SCP) is about "the use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of further generations". Key changes in the progression from SP to SCP have been shown in Figure 4.2. The World Summit on SD in 2002 conceptualised SCP in the very core of SD, placing a strong emphasis on poverty eradication, balancing sustainable consumption and production as well as protection and management of the natural resource base of economic and social development [4]. The Summit proposed to develop a 10-Year Framework of Programmes (10FYP) to help support national and international initiatives accelerate the shift to SCP. The 10FYP sought to generate collective impact through multi-stakeholder programmes and partnerships to develop, replicate, scale up and exchange technical and financial resources to foster SCP policies and initiatives at all levels. In the UN Sustainable Development Summit in 2015, the commitment to bring SCP into the mainstream was affirmed when it was included as a standalone goal (Goal 12) among the 17 Sustainable Development Goals (SDGs). In addition, since resource efficiency is an integral part of cleaner production and vice-versa, UNIDO and UNEP moved towards Resource Efficient and Cleaner Production (RECP) through establishment of RECP centres across the globe and establishment of a network (called RECPnet) in 2010 that allowed transfer of technology, information and expertise between members aligned together towards the path of SD and SCP [5]. As examples, the roles of Sri Lankan and Vietnamese National Cleaner Production Centres have been briefly explained in Box 4-1 in streamlining the concept of cleaner production in the industrial sector of the respective countries. Both of these are two of the many Centr-s that have been established in the Asia-Pacific region to provide training programmes, workshops and capacity building courses on cleaner production sector. In fact, by 2015, as many as 70 members had committed to RECPnet. The timeline of the progress from NCPC to RECPnet has been shown in Figure 4.3.

Box 4-2: National CP Centre Programmes across Asia Pacific region

Since 1994, UNIDO and UNEP jointly initiated National CP Center Programme in various countries across the globe. These centres provide overall administration, local liaison, and capacity building and technical assistance to promote CP strategies while bringing life-cycle perspective in analysing impacts of products and services.

Sri Lanka's National Cleaner Production Center is one of such centres in the Asia Pacific region. Since its establishment in 2002, NCPC Sri Lanka has stood as the foremost Cleaner Production solutions provider in Sri Lanka. It was set up under the UNIDO/UNEP Global programme of Cleaner Production and is one of the founder members of the Resource Efficient and Cleaner Production Network (RECP.Net). It provides services such as waste audits, water audits, carbon footprint calculation, IEE/EIA, energy management and so on. It also provides training and awareness related to all the services it provides. In addition, the Center conducts training programs on novel environmental concepts such as LCAs, Eco-Design, Eco-Innovation, Environmental Management and Accounting, and Sustainable Production.

Similarly, in Vietnam, VNCPC has played a focal role in disseminating the CP concept and promoting its adoption into the industries. The Centre has conducted several in-plant demonstration projects depicting successful implementation of CP. In addition, it has a pool of experts and specialists to help industries establish CP in its operation.

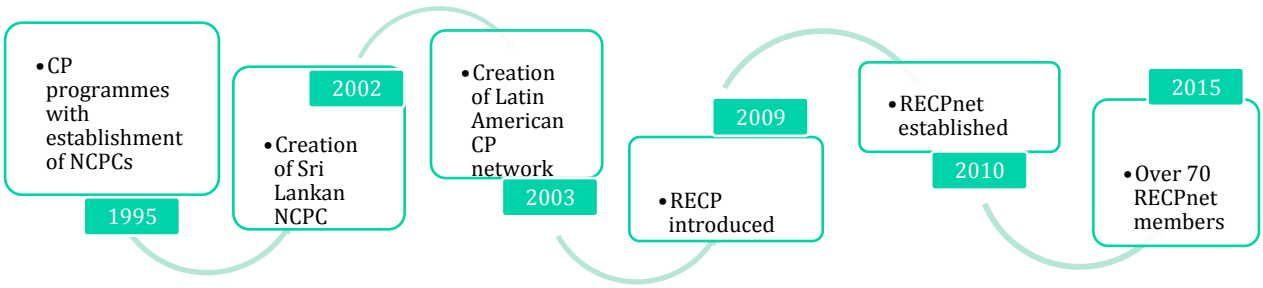

Figure 4.5: UNIDO-NCPC to RECPnet progress

Higher Education Sustainability Initiative (HESI) was created in partnership with UN entities (UNESCO, UN-DESA, UNEP, Global Compact, and UNU) in the run-up to the United Nations Conference on Sustainable Development (Rio+20). Over 300 universities from around the world have voluntarily committed to:

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

Initiation of networks and regional programmes helped people share information, improved research capabilities and promoted technology transfer. Networks could be for specific industrial sectors or broad groups. For example, preparation of benchmarks for industrial processes or quality of products could result in better or cleaner products. Therefore, it was soon widely accepted that SCP, CP and SD training activities should not only be limited to the training of specialists but also reach out to future technicians and planners.

In course of time, several projects under the theme of SCP were initiated across Asia Pacific region. The projects were mostly sponsored by the European Union-SWITCH-Asia project (the details of which has been described in section 4.2.1), followed by UNEP and other donor agencies such as UNIDO and UNESCAP. Figure 4.4 shows the distribution of randomly selected 151 SCP related projects in Asia from which it can be seen that India (24 projects) and China (16 projects) have the highest number of projects followed closely by Vietnam (13), Nepal (12), Myanmar (11) and Indonesia (11).

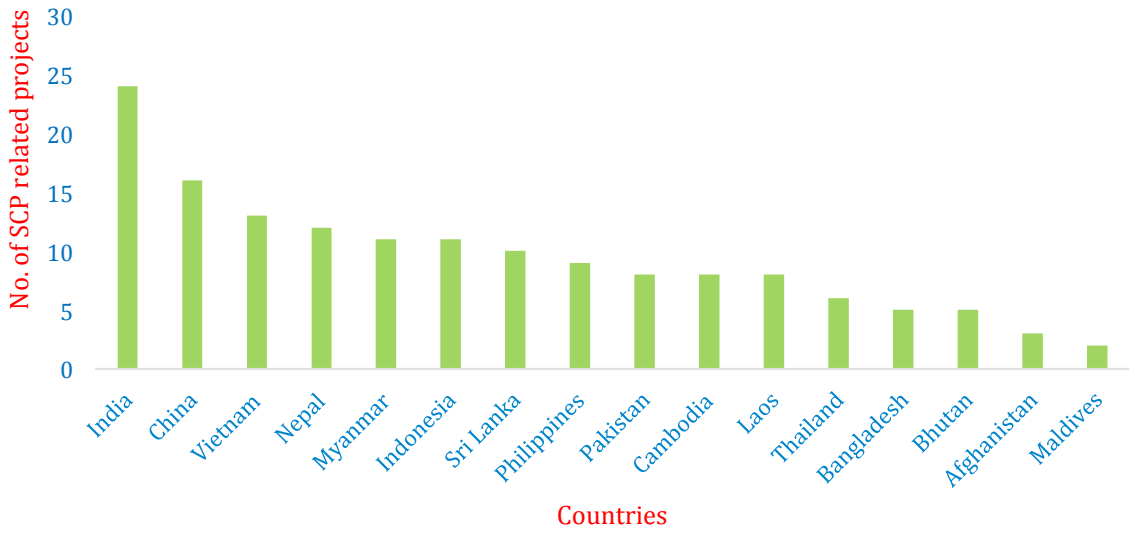

Figure 4.7: Number of SCP related projects in Asia

Figure 4.5 depicts the types of projects run under the theme of SCP. Evidently, most projects are run to promote cleaner production. This is followed closely by projects that are run in order to bring better and greener product design. Projects that foster eco-labelling are also given high priority.

Figure 4.8: Various types of projects related to SCP

Figure 4.6 further shows that textile and leather industries have mostly incorporated SCP with 14 projects dedicated to this. Furthermore, cross-cutting sectors such as the use of green products like improved cooking stoves (ICS), green financing, support to Small and Medium Enterprises (SMEs), etc. have also received priorities with at least 13 dedicated projects.

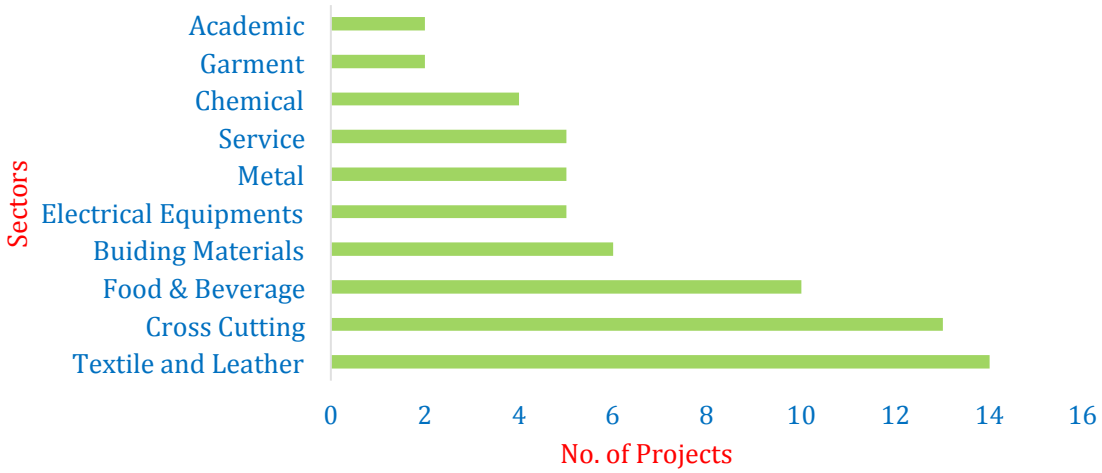

*Figure 4.9: Sectors covered under SCP projects**

**The data and information provided herein have been taken from a detailed internet review of websites that are available publicly in English language. Information from websites in other languages was not considered for this chapter.*

4.2 Regional and International SCP Education Programmes

At present, skills in sustainability are being viewed as significant for employability. In many sectors, incorporation of sustainable practices is no longer optional as more policies and regulations have been put in place by several countries mandating the need to consider environmental protection while in pursuit of economic development. As such, companies are looking to hire graduates with knowledge in sustainable development/sustainable issues who focus on the intersection of environment, economics, social and cultural issues. To exemplify, MBA graduate's role is not limited only to traditional supply chain management from business operation point of view, but also to ensure that the supply chain is sustainable as well. Similarly, instead of a conventional wastewater engineer who builds and operate the system, employers these days value those employees who can also make the system sustainable with high energy efficiency and low carbon footprint.

In higher education, sustainability has been included either as a new course or through modifications/augmentation into existing ones. Another option used in institutions is offering elective courses by bringing (both intra- and inter-disciplinary) faculties together to form a co-curriculum. The inclusions have either been pushed from the top (management board, academic committees or Senate) or through a bottom-up approach (faculty members taking an initiative by offering online courses, non-credit courses or conducting sustainability-themed research projects). On the whole, the initiatives to embed sustainability component in the higher education sector are seen to involve four major approaches [6] [7].

- Pedagogic approach/Changes in the Curriculum
- Research functions (Academic theses and/or funded research projects)
- Campus as sustainable living laboratories
- Outreach and engagement with stakeholders

The subsequent sections highlight the efforts of higher education institutions across Asia Pacific as well in other parts of the world to inculcate sustainability in their curriculum.

4.2.1 Regional Programmes

A review of the undergraduate and graduate level courses, particularly in the Asia-Pacific region, reveals that CP concepts have been progressively incorporated in many national universities. Taking a sample of 41 courses relevant to sustainability, it was found that engineering and management schools and departments are the leaders in incorporating the CP concepts into their traditional curriculum as shown in Figure 4.7. For example, in Asian Institute of Technology (AIT), Thailand, graduate degrees in Environmental Engineering and Management, Energy Management and Natural Resources Management programmes have been offering courses in CP, SCP, LCA as well as green chemistry. A course on holistic

waste management is in the pipeline in AIT. Similarly, all three of the major courses in this sector in Kathmandu University, Nepal are being conducted at the graduate and undergraduate levels by the Department of Environmental Science and Engineering. Tokyo University, Japan and Ruhuna University, Sri Lanka offer courses on sustainability in the field of agriculture. Only a few other departments such as Department of Social Sciences, Department of Natural Sciences as well as Department of Policy Studies have been offering courses in sustainability sector in several countries in the Asia-Pacific region.

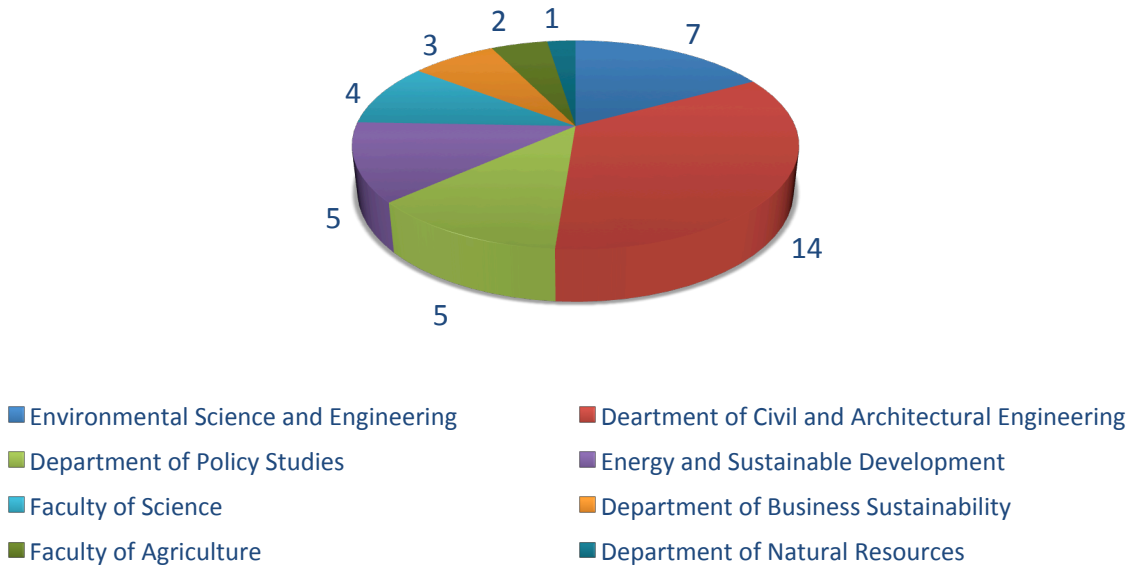

Figure 4.12: Proportion of academic departments offering sustainability courses

Several universities have started undergraduate and graduate level programmes that have been dedicated to fostering the concept of sustainability, although SCP is not yet focused solely. About 65% of the courses on sustainability are being delivered at the post-graduate level in the Asia Pacific region, and the other 35% at the undergraduate level. The number of listed courses in sustainability offered in national universities and higher education institutions across Asia Pacific has been shown in Figure 4.8. As seen in the graph, Pakistan, India and Japan have numerous programmes on the theme. On closer review, it was found that the courses on offer dealt with Sustainable Urban Transport, Supply Chain Management, Sustainable Development, Sustainable Energy, Sustainable Environmental Design, Cleaner Production, Green Technology, etc. In other words, the courses mostly dealt with sustainability and CP, and not necessarily on SCP. As an example, the Department of Business Stability of Teri University in India has been offering an MBA programme emphasising strongly on sustainability and corporate social responsibility (CSR). Three major courses dedicated in this programme comprise Sustainability Reporting (3 Cr.), Sustainable

Business Strategy (3 Cr.) and Supply Chain Management (2 Cr.) where each academic credit is equivalent to 14 hours of lectures, tutorials and practical exercises.

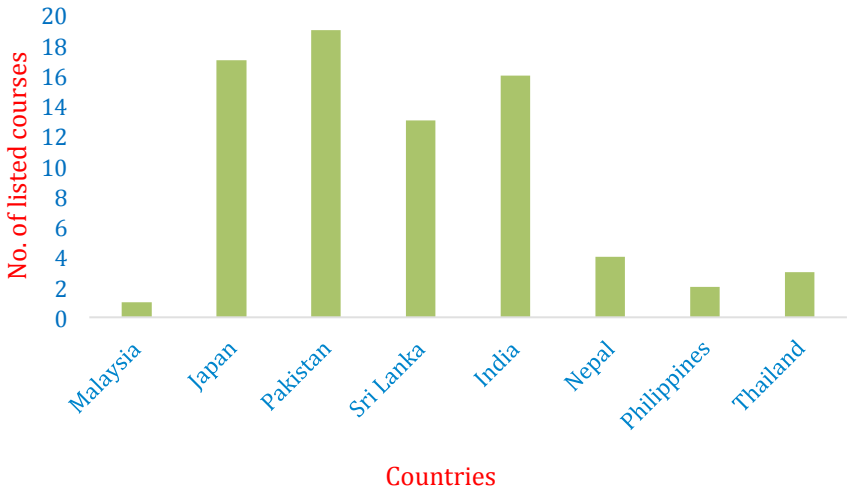

Figure 4.13: Number of listed courses in sustainability in Asia Pacific region

Such a programme aims to teach the students to report on economic, environmental and social impacts of the company's actions and projects to all concerned stakeholders. It comprises six modules in total that introduces the concept of sustainability reporting, monitoring and measuring sustainability performance and provides them with an overview of the relevant management standards and indices such as ISO, Social Accountability 8000, Dow Jones Sustainability Index etc. It also allows the students to plan and prepare a sustainability report with references to previously prepared reports by prominent Indian companies. In addition, a module on CSR helps students understand the concept of how it could be used to assess a company's initiative to take responsibility for its actions on the company's effects on environmental and social well-being.

Similarly, the course on Sustainable Business Strategy covers all aspects of strategies on sustainable business practices such as environmental analysis, internal analysis, strategic advantage analysis, strategy formation as well as implementation and control of the same. The teaching is mostly done through lectures, case discussions and exercises. The project works/case studies required by students to participate in involves analyses of mission and vision statement of five companies of various sectors, analysis of CSR of companies in a particular sector as well as preparation of internal factor evaluation (IFE), external factor evaluation (EFE), internal-external matrix (IE) and competitive profile matrix (CPM) for selected companies.

Considering that supply chain management is imperative to sustainable management of supply and demand, the course on Supply Chain Management aims to consider the complete picture in the supply chain, ranging from supply of raw materials, through factories and warehouses, to meeting the demand in sales outlets. The course focuses on bullwhip effect, types of supply chains, procurement policies, postponement and differentiation, outsourcing, distribution channels and collaborative aspects of supply chain. Similarly, a course on Information and Communication Technology for Sustainable Development is aimed at imparting basic knowledge and skills in ICT and management information systems. It strives to introduce the students to practical examples of sustainability challenges through case studies and help students understand to apply the ICT tools in development-focused organisations. In the subsections that follow, various educational programmes that are run in countries in the Asia-Pacific region have been briefly described.

I. Pakistan

Educational institutions in Pakistan have been offering numerous relevant courses through faculties of science and engineering as well as social sciences in post graduate levels. For example, National University of Sciences and Technology (NUST) in Karachi and Islamabad have MPhil and Doctoral level courses in Sustainable Energy Systems, Sustainable Construction and Social Engineering for Sustainable Development. The Institute of Environmental Sciences and Engineering (IESE) of NUST in Islamabad offers courses in Cleaner Production Techniques at the undergraduate level.

II. India

Prominent science and technology schools in India such as Indian Institute of Science, Banglore and Indian Institute of Technology, Delhi have been offering undergraduate level courses in the fundamentals of sustainable development. In addition, the School of Sustainability in Xavier City Campus, India has sustainability degree programs in Sustainability Science & Technology (SST) to address the challenge of SD by advancing scientific understanding of human-environment systems, application of science and technology to address sustainability issues and concerns improving linkages between research and policy communities and building capacity for linking knowledge with action to promote sustainability. The curriculum encompasses the basics and principles of sustainability science, legal provisions and policies, environmental challenges, as well as a course on climate change and natural resources. The course requires the participation of students in mini research projects, summer internship programmes as well as a capstone project.

III. Japan

Osaka University in Japan has several programmes in the sustainability sector. In the "Sustainable Environmental Design" course, lectures are provided on the relationship between human beings and the environment, on the search for a modality of sustainable cities, and the living environment. Some of the major subjects in the course comprise Principles of Urban Symbiosis, Engineering System Design for Sustainability, Design Techniques for Symbiotic Environment, Spatial Design for Symbiotic Environment and so on. Similarly, the subject on "Circulatory Material and Resources" offers lectures on material development for zero-waste materials and waste reclamation, environmentally friendly processes, including bioprocess, biomaterials, diagnosis, and remedy of body tissue; and medical and rehabilitation technologies. Other relevant courses offered by Osaka University include one on "Sustainable Energy" that is provided on the technologies and design of energy conversion systems, new energy materials, the application of renewable energy, and energy-saving systems for the development and management of sustainable energy systems. Ibaraki University in Japan runs a regional sustainability course to ensure community improvement and environmental preservation for the base of the sustainable development of ASEAN countries. The course is a 'Project Based Learning (PBL)' type and covers topics such as Regional Sustainability Science (1 Cr.), Adaptation to Environmental Challenge and Disaster Risk (2 Cr.), Regional Environment Management (2 Cr.), Environmental and Symbiotic Sciences (2 Cr.) and other field works and seminars.

IV. Australia

The University of Queensland in Australia also offers a 2 credit course on SCP offered under the School of Geography, Planning and Environmental Management. This course introduces students to consumption patterns and production processes using a life cycle perspective and examines why they can be unsustainable. Lectures on latest topics on SCP are covered including Cleaner Production & Resource Efficiency, Sustainable Transport, Eco-labelling and Certification, Sustainable Procurement and Marketing, Sustainable Lifestyles, Waste Management, Sustainable Resource Management and Design for Sustainability. Assessment of the course is done by involving students in determining the environmental impacts of products and services throughout their life-cycles.

4.2.2 International Programmes

Outside the Asia-Pacific region, courses in sustainability have been offered mostly by European educational institutions, although several international initiatives (individual or in collaboration) have been in place. Table 4.1 enlists a few international degree programmes in sustainability and the subsequent paragraphs describe a few international formal educational

programmes in the field of sustainability. It is followed by brief descriptions of international programmes in educational institutions outside Asia-Pacific region.

Table 4.1: List of few international programmes in sustainability

Name and address of institution	Course name	Major Subjects offered	Course structure
Aalborg University, Denmark	BSc in Environmental Management & Sustainability Science	Environmental Planning, Environmental Management Systems (EMS), Corporate Social Responsibility CSR), Life Cycle Assessment (LCA), Environmental Assessments (EIA and SEA), Eco-design and Climate Mitigation	Project work, coursework, PBL
Lund University, Sweden	Master of Science (120 credits) in Environmental Studies and Sustainability Science	Earth System Science (10 Cr.), Social Theory and Sustainability (10 Cr.), Sustainability Science (10 Cr.), Governance Sustainability (7.5 Cr.), Urban and Rural Systems Sustainability (10 Cr.), Economy and Sustainability (7.5 Cr.) and Knowledge to Action (5 Cr.)	Project work, coursework, PBL
Ghent University, TU Bergakademie Freiberg, Uppsala University	Joint Diploma of International Master of Science in Sustainable and Innovative Natural Resource Management	Intro. To Circular Economy, Economics and Management of Natural Resources (4 Cr.), Clean Technology (5 Cr.)	Project, coursework, internship, Master's dissertation
School of Sustainability, Arizona State University, USA	BA, BSc in Sustainability and Supply Chain Management	Society and Sustainability, Policy and Governance in Sustainable Systems, International Development and Sustainability, Sustainable Urban Dynamics, Sustainable Energy, Materials, and Technology, Sustainability and Enterprise etc.	Project, coursework, capstone internship or workshop
University of Technology, Eindhoven (TU/e), Netherlands	Bachelor's degree in Sustainable Innovation	Sustainable Development in Global context, Sustainable Technology in Society, Economics of Innovation: Introduction, Managing Sustainable Technology, etc.	Technical specialisation courses, elective courses, project works and field visits

I. United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS)

The United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS) has been focusing on advancing efforts towards a more sustainable future, through policy-oriented research and capacity development focused on sustainability and its social, economic and environmental dimensions. It has been actively involved in making valuable and innovative contributions to high-level policymaking and debates within the UN system. The activities of the institute are in three thematic areas: sustainable societies, natural capital and biodiversity, and global change and resilience.

The Master's Degree programme seeks to cultivate a holistic perspective to address the development needs of societies without affecting the underlying sustainability of the earth system, through an innovative interdisciplinary approach that integrates the natural sciences, social sciences and the humanities. The Doctoral Degree programme focuses on environmental sustainability as its central theme and provides comprehensive multidisciplinary knowledge for understanding sustainability problems in a holistic manner. The programme also fosters a deeper understanding of sustainability science through an analysis of current issues related to global change, with perspectives from both natural and social sciences.

II. KTH Royal Institute of Technology, Sweden

KTH Royal Institute of Technology in Sweden offers Master's programme in Sustainable Technology based on the concept of industrial ecology with a focus on the understanding of interactions between technical, economic, social and ecological systems and processes. The courses in the programme cover a range of interdisciplinary subjects such as Industrial Ecology, System Analysis, Transition theories, Cleaner Production, Ecosystem Performance, Ecological Economics, Industrial Symbiosis, Environmental Management and Circular Economy. Other relevant courses in this programme comprise LCA, Sustainable Food Production and Consumption and Sustainable Development in Developing Countries. The students are introduced to tools and knowledge that will enable them to apply technology in a more sustainable way.

III. The Universitat Jaume I and National Distance Education University (UNED), Spain

The Universitat Jaume I and National Distance Education University (UNED) in Spain have been offering an inter-university Master's Degree course in Sustainability and Corporate Social Responsibility to help students understand the concepts of sustainability and CSR and their multiple dimensions in depth. The course emphasises on the application of existing management and assessment tools, the policies and strategies implemented at all

organisational levels involving CSR, and the mechanisms for dialogue and interaction with the main stakeholders and interest groups. Another relevant programme offered in the same university is Master's Degree in Energy Efficiency and Sustainability. The programme covers 60 ECTS credits and is aimed at both professional futures as practitioners in fields related to industrial installations and building. The subjects in the course allow the students learn about various energy technologies, essential to address the problems related to energy and environmental sustainability. The course is divided into five blocks. Three of these blocks (Homogenization, Research and Environmental Management) are common and are intended to strengthen and standardise the basic knowledge. The remaining two are of expertise. The first set of expertise is geared towards energy efficiency in industrial facilities, while the second is geared towards energy efficiency in buildings.

IV. The University of Barcelona, Spain

The University of Barcelona in Spain has a Master's degree programme in Renewable Energy and Energy Sustainability to respond to the challenges posed by the current energy and environmental context, in which sustainability stands as the new paradigm of reference. The curriculum addresses this concept from all its aspects and prepares students to work in companies and institutions that provide sustainable solutions and integrate sustainability into their business strategy. The programme offers lectures of interdisciplinary nature as the lectures are delivered by instructors that come from different departments such as Physics, Chemistry, Biology, Geology, Law, and Economics and Business. In addition, online classes are complemented by seminars given by professionals from important companies in the sector.

V. Sustainability Management School (SUMAS), Switzerland

Sustainability Management School (SUMAS) in Gland, Switzerland has been offering a full-time (one year) or part-time (two years) Master in Management with an emphasis in Sustainability Management to offer a predominantly professionally-oriented education that addresses sustainability challenges facing leaders in today's complex work patterns. This programme is interdisciplinary since it blends business strategy, natural and social sciences and is designed for all professionals in corporations, non-profits and governmental agencies demanding sustainability knowledge and practice. It has 9 core modules and 5 major courses. The program also features projects in collaboration with local and international partners and a final dissertation. During the program, the students learn to apply innovative solutions for a sustainable economy, society and environment through the practice-oriented projects that are guided by academics, consultants and professionals. These projects are part of SUMAS' innovative teaching methodology which includes video conferences with speakers in business schools and multinational organisations such as Procter & Gamble and Barilla.

4.2.3 Vocational Education and Training

In parallel to the above listed courses, formal university degree programs, several Europe-based organisations, such as European Centre for the Development of Vocational Training (CEDEFOP) and European Training Foundation (ETF), as shown in Box 4-2, have been involved in vocational education and training (VET) to countries in Europe and beyond in order to train and produce human resources adept at sustainable production.

Box 4-5: Selected European organizations that offer VET in sustainability

CEDEFOP
European Centre for the Development of Vocational Training

ETF
Working together Learning for life

Since 1975, CEDEFOP has been helping develop Vocational Education and Training (VET) policies and implementing them in the European Union. These policies are in line with Europe's strategy for 2020 for smart, sustainable and inclusive growth based on knowledge and innovation. CEDEFOP provides technical advices and ideas so as to fill knowledge gaps and generate strategies to overcome the hurdles in VET. It does so based on the ideas and arguments put forth by policy-makers, social partners, VET researchers and practitioners of the European Commission (EC), Members States' governments, trade unions and so on. More information available on: http://www.cedefop.europa.eu/

ETF, based in Turin, Italy, contributes to the development of human capital in the EU partner countries as well as developing countries elsewhere through the reform of education, training and labour market systems. It works with a conviction that skilled human capital is imperative to sustainable growth of countries. As such, it aids the EC in the design and deployment of external assistance to the partner countries by providing country, regional and thematic background analyses. It also helps partner countries through dissemination of information, networking and exchange of experience and good practice, joint participation in conferences and workshops, research or analytical works and so on. More information on: http://www.etf.europa.eu/

4.2.4 Early Childhood Education

In many countries, early education programmes are launched to inculcate the concept of sustainability from a young age. Boxes 4-3 and 4-4 present some cases of early childhood education programmes in selected Asian countries. These programmes mostly comprise project works that involve children to participate in exercises that foster concepts of social responsibility, sustainable consumption and judicious use of natural resources.

Box 4-6: Case studies of early education programmes in sustainability

The 'Aflatoun' Curriculum in primary schools of Pakistan

UN Environment, through the EU SWITCH Asia programme and Ministry of Climate Change of Pakistan partnered with Aflatoun International and the Pakistan Institute for Environment-Development Action Research (PIEDAR) to strengthen Pakistan's environmental education and national curriculum policies to shape resource efficient behaviours and sustainable livelihoods. This was done by adapting Aflatoun's curriculum in the primary level education. The curriculum incorporated three pillars of SD: (a) Managing Natural and Financial Resources, (b) Planning and budgeting for a Sustainable Future, and (c) Environmental and Financial Enterprises.

In Kyoto, Japan, children from very early age are given education for sustainable development (ESD) to allow them learn about and experience diversity of cultures, people as well as nature, and thereby learn to respect nature and community. This is generally done using project works that are parts of the curriculum of the academic calendar.

Details can be found at: http://www.aflatoun.org/education-policies-systems-can-shape-resource-efficient-behaviour-sustainable-livelihoods/

Early childhood education in Kyoto, Japan

Fujii and Izumi [8] have presented a case in Takatsukasa Hoikuen Childcare Centre, Kyoto where children are engaged in nurturing silkworms. The Japanese have had a long association with the production of silk, and learning about silkworms is considered important enough to be included in the elementary school curriculum particular in relation to teaching and learning about sustainable development. In this, children are asked to look after the worms, feed them mulberry leaves and clean the boxes, and in doing so observe their transformative life cycle of silkworms and marvel at how nature transforms living beings from one state to another. This, in turn, entails a sense of responsibility and curiosity towards nature among the children and enable them to understand how the human lives depend on nature and learn the ability to seek solutions and make decisions to foster judicious use of natural resources.

Other case studies on early childhood education on sustainability can be found at: http://unesdoc.unesco.org/images/0015/001593/159355e.pdf

Box 4-4: Case of Bhutan's efforts to foster sustainability education in school children

EduCaring for Universal Happiness

DESIGN for CHANGE BHUTAN

Early learning centre in Bhutan

The Early Learning Centre (ELC) in Bhutan is a primary school that goes up to 6th grade. Since its founding, ELC has been emphasizing the development of values such as empathy, compassion and social responsibility towards community and nation at large in school children. The concept is in line with the Gross National Happiness (GNH) concept in Bhutan.

ELC, in partnership with Design for Change (DFC), has been working in several projects to empower and enable children to solve problems of the society using four-step formula: feel, imagine, do and share. One of such a project was their initiative to lessen the consumption of packaged food. This was an attempt to advocate the concept of waste and its implications of the environment, human health and the economy. As such, ELC launched a campaign to consume packaged food only once a week (on Wednesdays), while also ensuring that the food waste is disposed of in compost pits. The paper waste, would be managed by Greener Way, a waste management and recycling firm in Bhutan whereas the plastic waste would be reused and recycled.

This idea was shared in Thimpu Principals' Conference as well as through national television to encourage other schools to join in. At least 80 schools has endorsed this campaign in Bhutan.

Details of the programme can be found on:
Early Learning Centre (ELC): http://elchighschool.co/
Design for Change Bhutan: http://dfcworld.com/dfc/BHUTAN/

4.2.5 Non-formal Education

Several awareness and training programmes targeting specific stakeholder groups are conducted in many countries. One of the important stakeholder group targeted is the administrative staff of the government sector, as they have a decisive role to play in planning as well as setting up of a conducive environment for mainstreaming SCP within national development plans. Boxes 4-5 and 4-6 present two such programmes conducted in Vietnam and Australia.

Box 4-5: Example of SCP training for national administrative staffs

SCP training for National Academy of Public Administration, Vietnam

Considering that policy makers have decisive role to play in implementing SCP programmes, the National Academy of Public Administration (NAPA), Vietnam and Asian Institute of Technology (AIT) co-organized a training course "Introduction to Sustainable Consumption and Production and Eco-innovation for policy makers" for 50 senior civil servants on November 10-11, 2016. The course was delivered by Dr. Walter Reinhardt – UNEP Project Coordinator and Nguyen Thi Bich Hoa – Deputy Director of AIT Vietnam.

The training course comprised of programmes to provide basic concepts of SCP and eco-innovation to the policy makers. In addition, it also had arrangements to explain the key challenges and barriers in promoting eco-innovation in various industries in Vietnam. On the whole, the participants were engaged in lectures and activities to address the need to incorporate SCP, particularly during the period of industrialization and modernization in Vietnam, which is characterized by production growth and the increase of new municipal areas that has led to more consumption and environment pollution.

More details of this can be found at: http://www1.napa.vn/en/training-course-for-napa-lecturers-introduction-to-sustainable-consumption-and-production-and-eco-innovation-for-policy-makers.napa

Box 4-6: Sustainability in Australian Public Service

Making Change for Sustainability in Australian Public Service

In order to ratify the three pillars of sustainability- environmental quality, social equity and economic development-in the Australian Public Service (APS), Australian Government adopted a systemic approach to make an organizational change. This was done through a project called "Sustainability in Government" in which the Australian Government Department of the Environment and Water Resources (DEW) engaged the Australian Research Institute in Education for Sustainability (ARIES) and Urbis JHD to help promote organisational change, learning, and transformation for sustainability within the public sector. The project used a participatory inquiry approach facilitated focus groups in order to engage the participants from Australian Government departments and agencies (such as Australian Public Service Commission, Department of the Environment and Water Resources, etc.) to simulate new ideas for action in attaining organizational drivers of sustainability.

The aims of the project were to:

1. Identify organisational drivers of sustainability within the Australian Government, based on individual and collaborative experiences
2. Build increased cross-department/agency networks to develop better solutions for sustainability
3. Increase participants' levels of understanding of sustainability and their capacity to engage in change for sustainability
4. Inspire and motivate participants to make change towards sustainability within their own departments and agencies, and across the Australian Government as a whole.

The details of the project can be accessed on:
http://aries.mq.edu.au/projects/SustainInGovt/files/SustainabilityInGovernmentFinalReport.pdf

4.3 Appraisal of SCP Educational Projects

4.3.1 SCP Education Activities under SWITCH-Asia Projects

In 2008, the European Commission launched the SWITCH-Asia programme to help interested consumers, businesses and supporting associations switch to a more sustainable paradigm with a goal to promote economic prosperity and help reduce poverty in Asia by

encouraging a sustainable growth with low environmental impact from industries and consumers, in line with international environmental agreements and processes. In particular, SWITCH-Asia seeks to facilitate a transfer of technologies and information in order to promote sustainable products, processes, services and consumption patterns in Asia by improving cooperation with European retailers, producer and consumer organisations and the public sector. In this direction, SWITCH-Asia in partnership with TERI University has developed and delivered the first MA course on SCP taught in a developing country. It is an attempt to increase skilled human resource who can champion SCP campaigns, ensure behavioural changes and also integrate SCP into academic curricula. The course has been outlined in Box 4-7.

Box 4-7: Course on SCP in Teri University as a part of SWITCH- Asia Regional Policy Support Component

Objectives:

- To impart knowledge on SCP concepts, significance and advancements within India and wider South Asia region in order to create a pool of better informed future policy makers.
- To equip young policy makers with knowledge on demand side and supply side challenges and opportunities relating to SCP
- To equip young policy makers for policy analysis of select sectors targeting to mainstream SCP into policy.

Course contents:

- Introduction to Sustainable Consumption and Production (SCP)
- SCP in Regional, National and Local Policy Frameworks
- Demand-side: Sustainable Behaviours and Lifestyles
- Supply-side: SCP for Resource Efficiency and Cleaner Production
- Mainstreaming SCP I - Development and Implementation of Policies
- Mainstreaming SCP II – Sectoral Strategies for Urban Settlements
- Mainstreaming SCP III - Economic and Fiscal instruments

Outcomes:

- To have an improved understanding of SCP and interrelationship between sustainable consumption and sustainable production
- To be able to compare and contrast effective applications and business case for SCP in sustainable development with reference to specific countries and economic sectors
- To be able to examine the potential synergy of SCP with existing plans and policies
- To have learned the significance of various policy instruments, strategy options and institutional arrangements to mainstream SCP for effective SD governance

Pedagogical arrangement:

- Classroom lectures, brainstorming tutorial and presentation sessions, study visits and exposure to national, regional and global case studies on the theme.

4.3.2 UNITAR e – learning course on SCP

UNITAR and UNEP have aligned together to scale-up SCP learning in Asia Pacific region and provide policy makers with a comprehensive understanding of the SCP concept and application. In this direction, the two organisations have helped develop and deliver the e-learning course "Introduction to Sustainable Consumption and Production in Asia". The course development and delivery have been supported by the SWITCH-Asia Programme of

Box 4-8: Online Course on SCP organized by UNITAR

Objectives:

- Define the concept of SCP and explain its value for sustainable development;
- Distinguish key elements of effective policy planning in support of SCP;
- Identify enabling conditions for mainstreaming and implementing SCP policies in national governance;
- Discuss principal challenges and opportunities for advancing SCP in national contexts;
- Summarise the range of global and regional initiatives to support the mainstreaming of SCP in national governance;
- Apply SCP to a real-life policy-making context

Course contents:

- Module 1: Introduction to SCP: Definition, Rationale and Fundamentals
- Module 2: Designing and Implementing National SCP Policies: The Policy Cycle and SCP in National Governance Structures
- Module 3: Applying Policies to Key Thematic Areas for Supply-side Change and Sustainable Production
- Module 4: Applying Policies for Demand-side Change and Sustainable Consumption
- Module 5: International Collaboration, Regional Initiatives and Priorities to Achieve SCP in the Post-2015 Sustainable Development Agenda

Outcomes:

- An applied case study provides participants with the opportunity to apply the SCP concept in the framework of a real world situation. Participants will identify the problem context, relevant issues, define appropriate measures, and develop a SCP action plan for a particular setting. Each case study is peer-reviewed by a group of course participants, as well as the course moderator.

Pedagogical arrangement:

- E-lectures, tutorial, interaction/discussions and presentation sessions, study visits and exposure to national, regional and global case studies on the theme.

Targeted audience:

- Civil servants in national ministries, provincial departments and local authorities, Environmental managers in private sector, representatives from civil society organizations, academia representatives and researchers, other individuals engaged in policy processes.

Website: https://www.unitar.org/event/full-catalog/introduction-sustainable-consumption-and-production-asia

the European Union. This is the first e-learning course of its kind and is developed specifically for use in the Asia-Pacific context. Details of the course have been shown in Box 4-8. The course encompasses tools to assist policymakers from the region in developing, implementing, monitoring and evaluating policies supporting a transition towards SCP. The content is based on the manual "Sustainable Consumption and Production: A Handbook for Policy Makers", developed by UNEP, and a number of other relevant publications on SCP.

4.3.3 Asia – Pacific Winter School on SCP

Asian Institute of Technology, Bangkok hosted the "UN Winter School on SCP in Asia and Pacific". The programme intended to help participants understand what SCP and resource efficiency are and how they contribute to sustainable development, poverty alleviation and sustainable livelihoods (and the relative contributions by different socio-economic sectors, geopolitical countries, etc.). It also aimed at teaching participants to use alternative policy instruments, strategy options and institutional arrangements (including networks) for achieving resource efficiency and its subsequent development, climate and environmental conservation outcomes while developing analytical advocacy and implementation capabilities and skills, in particular through practical piloting of selected resource efficiency methods, techniques and policy instruments, as appropriate to the backgrounds and interests of participants. The topics that were covered in the programme have been shown Box 4-9. This is the first programme of this nature developed jointly by UNEP and AIT. Later, this program was conducted in India and in Sri Lanka with some minor modifications.

Box 4-9: Topics discussed in UN Winter School on SCP in Asia and Pacific in AIT, Bangkok

Curriculum of the UN Winter School on SCP in Asia and Pacific in AIT, Bangkok

- Module 1: SDGs and SCPs
- Module 2: Global context of SCP
  - Module 2a : Introduction to Fundamental Concepts of SCP
  - Module 2b: SCP and the global economic system
- Module 3: Sustainable Production Theory and Applications in Manufacturing Sector
  - Module 3a. Cleaner Production
  - Module 3b. Design for Sustainability
- Module 4: Sustainable Consumption and Tools for Practicing Sustainable Consumption
  - Module 4a: Sustainable Consumption
  - Module 4b: Sustainable supply chain management
  - Module 4c: Sustainable Public Procurement
- Module 5: SCP in Various Sectors
  - Module 5a: SCP in Cities and Infrastructure
  - Module 5b: SCP in Tourism Sector
- Module 6: SCP Policy
- Module 7: SCP Financing and in private business

Other initiatives of SWITCH-Asia project in SCP includes SMART Myanmar (website attached in Figure 4.9) which has collected many relevant training materials useful for local SCP consultants to deliver quality services to the business community. These materials are compiled in an SCP toolbox covering the variety of topics related to SCP, used and maintained by the SCP consultants. The content of the toolbox was gathered and developed throughout the training of the SCP consultants during the three-year implementation phase of SMART Myanmar. It is a "working collection" that will be augmented continuously by the SCP consultants and the SCP component senior project manager.

SWITCH-Asia has also been involved in training programmes and workshops. One of such a programme is BLISS (Building Learning In Sustainability Science) School on Sustainability which is a series of five-day events organised by the TERI University to train and prepare the stakeholders for forthcoming sustainable development challenges and to instil in them the knowledge and sensitivity about the people and the planet. The aim is to generate awareness and create a campaign to champion the cause of sustainability and sustainable development in both, the local and the global context. A programme was held in November 2015 that focused on interdisciplinary learning under the theme—'SDG 12 – Ensuring Sustainable Consumption and Production Patterns'. The winter school was conducted online as well as face-to-face and was be led by experts in the field. Another similar education project (workshop), UN Winter School on Sustainable Consumption and Production in South Asia, was conducted on November 7-19, 2016. It was organised by UNEP and its partners, South Asia Cooperative Environment Programme (SACEP), and University of Peradeniya Sri Lanka. The workshop aimed to assist future decision-makers from South Asian countries to respond better to the growing needs to mainstream SCP by raising their knowledge in this field.

Figure 4.9: SWITCH Asia funded SCP education projects

4.3.4 Other SCP Education Projects and Activities

SCP education projects have been conducted by projects other than SWITCH-Asia across the world. Some of such projects have been defined in the following paragraphs:

I. The CSR Asia Summit

The CSR Asia Summit facilitates the collaboration of concerned stakeholders including a unique mix of business, government and civil society come together to network and identify sustainable solutions to today's pressing challenges of meeting economic development without compromising environmental protection efforts. The summit prioritises bolstering efforts for having meaningful dialogues around critical sustainability issues, particularly in the Asia-Pacific region. On the whole, the collaboration attempts to enable a high-level conversation with the speakers (who are often leaders in the field) and participants from different sectors and geographies.

II. U.S. Baha'i Office of Public Affairs (OPA), USA

Another high-level discussion on SCP, similar to The CSR Asia Summit, is organised by U.S. Baha'i Office of Public Affairs (OPA). The OPA representative helps organise an expert panel discussion on transforming a culture of consumerism to a culture of sustainability. Through one such discussion, the representative led the drafting of a statement concerning the issue of sustainability which was delivered in the opening plenary of the UN meeting. OPA participates in several forums on sustainable consumption and production, including the North American Roundtable on Sustainable Production and Consumption (NARSCAP), the Sustainable Consumption Research and Action Initiative (SCORAI), and the Global Research Forum on Sustainable Consumption and Production (GRFSCP).

III. The Institute for Global Environmental Strategies (IEGS), Japan

The Institute for Global Environmental Strategies (IEGS), Japan conducts research activities in line with SCP, emphasising on appropriate waste treatment in cities, the formation of effective recycling systems in Asia, policy analysis from the perspective of SCP centred on the improvement of resource productivity, and policy recommendations focused on lifestyle changes. Furthermore, based on the groundwork of knowledge related to material flow, resource productivity, waste management and 3R policies cultivated by IGES to date, integrated research is planned to be initiated as parts of a step towards SCP, including management of natural resources, water, food and energy.

IV. Regional Activity Centre for Sustainable Consumption and Production (SCP/RAC)

Similarly, Regional Activity Centre for Sustainable Consumption and Production (SCP/RAC) has helped with the implementation of SCP by developing National Action Plans, the first of

which was drawn up by the Government of Croatia, with the collaboration of the MAP Coordination Office (MEDU) and UNEP Regional Office for Europe. This action plan emphasises various sectors and instruments to separate the country's economic growth from environment degradation. Such sectors comprise initiatives like eco-tourism, organic farming, CP, eco-labelling, CSR among others. SCP/RAC has also created a discussion forum of representatives from ministries (environment, economy, industry, tourism, agriculture, fisheries, health, and transport), and business and civil society organisations along with other national and international actors to consult emerging issues. This has enabled a document to be drawn up that analyses the context of international policies in this sphere, along with key sectors of society where action can be taken to make the transition of SCP from a mere action plan to reality.

Another SCP/RAC project on SCP is the fostering of sustainable public procurement, understood as a process in which public authorities meet their need for goods, works and services efficiently whilst reaping economic, social and environmental benefits. The Centre organises work sessions and capacity-building workshops to publicise the benefits to be gained and to foster their inclusion in the public policies of Mediterranean organisations.

The SCP/RAC further intends to develop National Action Plans for sustainable public procurement and their subsequent implementation. Likewise, it aims to continue its commitment to awareness raising and dissemination, and to creating experience exchange networks that help an increasing number of organisations in the region to include sustainability criteria in the procurement of goods, works and services.

4.4 Conclusions

The unsustainable consumption and production of resources have deteriorated global environment and economy. As a result, the issue has been long debated in order to shift towards a more resource-efficient and low-fossil carbon production processes. This is particularly true in rapidly expanding regions with growing population like the Asia Pacific. The concept of SCP is relevant to this region considering that it has the potentiality to offer much to this issue, particularly in terms of sustainable lifestyle models based on traditional values [3]. In fact, some of the countries in the region have already taken steps in implementing the SCP concept by conducting nationwide campaigns; Japan's 'Sound Material Flow Society', Bhutan's concept of 'Gross National Happiness', and Thailand's 'Sufficiency Economy' policies being a few examples of this effort.

In this chapter, various academic and non-academic endeavours in the Asia Pacific region have been reviewed with the sustainability concept in the backdrop. This was done by

reviewing the status and curriculum of both formal and informal education categories, across all levels of education, i.e. from early childhood/primary education to university level courses. It was realized that different academic disciplines offer courses on sustainability which, in turn, led to a conclusion that coordination between the departments seem crucial to successfully conduct the courses. In addition, the theoretical knowledge gained in classes need to be brought into practice, and gradually streamlined to national policies.

Traditionally, sustainable production courses have been dealt from an energy-based and environmental perspective (initially through cleaner production courses). There are examples of several universities incorporating courses to foster energy-efficient production. The academic efforts were supplemented with informal (and often ad-hoc) trainings from industries and National Cleaner Production Centres that geared the move towards sustainable production practices in industries. On the other hand, sustainable consumption has been mostly attributed to socio-cultural practices and lifestyle of people, and therefore, steps to promote sustainable consumption have been driven by sustainable development education to inculcate concepts of judicious use of resources. However, the efforts to foster sustainable consumption was not directly linked or insufficiently covered in formal and informal trainings and education. As such, it has been increasingly felt that sustainable production and consumption cannot be standalone goals, and should be promoted simultaneously.

Application of SCP concepts was thus put forth as next major step in industrial development in order to address sustainable production and consumption simultaneously. Gradually, energy efficiency has been integrated as a part of professional training programs and formal academic curriculum. Furthermore, professional training conducted by various international and regional organisations, which previously considered these aspects but too often focused on a few selected industrial sectors, have now started to formalize SCP concepts as a driving policy. Academic curriculum have also introduced SCP concepts at undergraduate and graduate level by modifying existing curriculum as well as organising a series of specialised SCP courses. Several examples of such efforts have been provided in this chapter. Furthermore, examples and case studies of primary and secondary level education on sustainability have been referred to outline the progress of SCP concept in Asia Pacific region, as well as in other parts of the world. Although information on early education childhood and vocational trainings are scattered, few important cases (such as those in Bhutan, Japan, etc.) have been briefly provided in this chapter. In addition, several initiatives and campaigns launched by leading actors and stakeholders such as governmental and non-governmental, national and international agencies have also been referred.

To conclude, it is very important to develop and publicise a more concrete definition of sustainability within the curriculum, sustainability-related and sustainability-focused courses

while increasing the capacity for providing the faculties with the necessary professional development, resources, incentives, recognition, and support for developing and implementing sustainability curricula. Through integrated and coordinated sustainability education and trainings, multidisciplinary opportunities such as green and lean supply chain management and green consumerism can be promoted. This will consequently bolster economic development without overexploiting the available resources.

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5 Formulation of SCP Educational Programme Plan

5.1 Situational Analysis

5.1.1 In Country Situation

I. Historical perspectives

Although the sustainable development is a well-known term, the concept of SCP is a relatively new terminology for the education sector in Sri Lanka. However, several fundamental topics related to SCP have been introduced into the education system from early childhood to university and adult education levels. Historically, environment education was introduced to the formal education system from primary schools, followed by energy resources and management. Implementation of Environment Pioneer Programme (EPP) and the establishment of Eco Clubs in schools by Central Environment Authority (CEA) have provided more opportunities (outside the curriculum) for the school children to learn sustainability concepts. These initiatives are followed by the introduction of energy (resources and management) into the formal education systems in school. Accordingly, energy clubs have been established to support the formal education, with the assistance of Sri Lanka Sustainable Energy Authority (SLSEA). Although early childhood education is not a part of the formal education system, both CEA and SLSEA implement pre-school teacher training programmes on environment and energy areas, respectively. The concept of sustainable consumption is mainly introduced through the energy conservation aspects. The two authorities also conduct another training programme for different stakeholders on the above topics.

The university education system has introduced the concepts of sustainable development, energy and environment-related courses several years back in both undergraduate and postgraduate levels. Topics related to these concepts are taught in related subjects as well as specific subjects. Almost all the university degree programmes include these topics in the curricula, but the topic of SCP is still not prominent. Technical and Vocational education programmes have also incorporated similar subjects into the curricula, though not prominent as those of universities.

The most significant development of education on SCP could be attributed to the short training programme conducted by National Cleaner Production Center (NCPC). Conventionally, these Continuous Professional Development (CPD) programmes are on cleaner production, but in the recent years, the concept of SCP has been incorporated into the programme. Some non-formal education programmes such as Scouts too have introduced environment and energy education as components of their educational activities.

II. Present status

The concept of SCP is still more or less a new concept in the education system in the country. However, the energy and environment-related education is in further development, as more prominent is given in the recent past, particularly due to some energy and environment related crises/disasters. These developments/initiatives are prominent in University education, and in particular, the curricula of new degree programmes introduced recently contain more subjects related to sustainable development, environment and energy. In school education, the programmes related to environment and energy are continued more or less at the same level, However, a number of new programmes have been initiated by the Ministry of Education to promote environment education. In a number of universities, specific undergraduate and postgraduate programmes have been initiated related to above areas, and new subjects are being introduced in many degree programmes.

SCP related education through informal sector is not visible, except in instances of major crises (environment/energy).

III. Way forward

The emphasis on the sustainability-related topics are emerging in the education sector. In particular, expansion of degree programmes in the Universities and also curriculum revisions associated with local/international accreditation and quality assurance schemes pose new opportunities to introduce sustainability-related subject topics. Similar opportunities are seen in technical and vocational education due to the upgrading of the courses. There are opportunities in CPD and non-formal educational programmes. However, lack of human resources and expertise (educationalist) has hindered the progress, except for university system in general. Even in schools, the capacity of the teachers in the areas of energy and energy are limited. The initiation of SWITCH-Asia SCP NPSC for Sri Lanka has created an ideal opportunity for the country to shape its education system, as required by the SDGs. The related experiences in the past and exposure to the regional and international efforts and initiatives will help the country to formulate a sound SCP education plan programme.

5.1.2 Regional and International Situation

I. Historical perspectives

The review of the status of sustainability related educational activities across all the sectors and levels of education at various academic and non-academic efforts in the Asia Pacific region reveals that the subject topics on sustainability are offered in different academic disciplines. The topics covered in the early stages have been primarily on the subject of energy and related environmental perspectives. These efforts were primarily through cleaner production courses, where formal educational programme was supplemented with short-term CPD programmes offered by industrial organisations and NCPCs. In the case of sustainable consumption, the concept has been mostly attributed to socio-cultural practices and lifestyle

of people. Accordingly, sustainable consumption has been driven by sustainable development education on the sensible use of resources. However, the emphasis on sustainable consumption in both formal and non-formal sectors of education was not sufficient, and the need for promoting a holistic approach of sustainable production and consumption emerged.

II. Present status

The emergence of application of SCP concepts marked a major step in the industrial development, in which the two aspects of sustainable production and sustainable consumption are addressed collectively. This had gradual but profound effects on professional training programmes offered by various international and regional organisations, where more emphasis was given to SCP. Meanwhile, academic curricula of formal educational programmes in universities at undergraduate and graduate level have also introduced SCP concepts. The strategy of introduction to existing curricula is either through the integration of SCP topics into existing subjects or introduction of SCP subject module to the curricula. The concept of energy efficiency too has been emerged, which is now an integral part of many related courses. Although information on other sectors/levels of education, such as early childhood education and vocational & technical education is limited, there are few important cases/success stories. The literature survey also indicates that there are several initiatives and campaigns launched by different stakeholders.

III. Way forward

The regional experiences clearly indicate that there is an increasing emphasis on the SCP education and training. Although a considerable progress of SCP education is experienced in the region, still there are many areas for improvement to mainstream SCP in all the sectors of education. There are regional and international initiatives to support the national level activities. Development and introduction of more specific courses with sound curricula, with a clear definition of sustainability-related aspects, become important steps. The curricula should be supplemented/complemented by enhancement of physical and human resources, facilities, other motivational aspects such as incentives and recognition for the parties involved would become success factors. The promotion of SCP education would result in a transformative change in not only the education itself but also the economy of the country for the betterment of the society. These experiences in the region and elsewhere are beneficial for the formulation of a sound SCP education plan programme for Sri Lanka.

5.2 Analytical Framework

5.2.1 Overview of the Planning Process

SCP education plan programme is set forth with the need of introducing the related underlining concepts to the Sri Lankan education system as a life skill. In particular, it is emphasised to promote education as a key agent for change by integrating SCP into the education system at all levels covering formal (pre-school to high education) as well as non-

formal and informal education sectors, while encompassing the basic provisions of the other global initiatives such as Education for All (EFA) and ESD. SCP education plan programme should also focus on the setting up of a conducive environment for its successful implementation through:

- Establishing supportive policy, institutional, regulatory, and operational frameworks;
- Building capacities of educators possessing the required competencies, with particular emphasis on teaching interdisciplinary themes;
- Ensuring the accessibility of adequate education tools and materials, with particular emphasis on learner-centred approaches to classroom teaching and outcomes-based assessments;
- Fostering research and development;
- Promoting partnerships & networks and strengthening coordination & collaboration locally, regionally and internationally.

Accordingly, the development and implementation of the SCP education plan programme for Sri Lanka are primarily based on the methodology proposed in Chapter 2, involving stage-wise but the cyclic process with prospects for stakeholder consultations and continuous improvements. The process starts with the situational analysis on the education for sustainable consumption and production (ESCP) and related areas locally, regionally and internationally. This enables the education planners to shape the SCP education plan programme more appropriate for the local context while integrating into the broader contexts of EFA and ESD. This is followed by the formulation of the SCP education plan itself, with programme components and activities on aspects related to the setting up of a conducive environment, implementation, monitoring & evaluation, and review & update, details of which are presented in the subsequent sections.

5.2.2 Policy and Institutional Frameworks

As reorienting the educational efforts towards SCP is principally a transformative approach to education, the interventions should also look into the policy environment. In fact, developing an overall SCP policy framework, enhancing the economic, social and environmental benefits of SCP and providing further direction for upgrading the national policies in Sri Lanka is one of the five focus areas of SWITCH-Asia SCP NPSC SL Project. Accordingly, as presented briefly in Section 1.4, an overarching national policy on SCP has been proposed, which is coherent and integrated with related sectoral policies, including those of education sector. This national policy, which is still in a draft version, applies to all sectors where either consumption or production of a good or service is involved in any form and expected to benefit the all without excluding any segment or strata of the society or any organisation. The subject of education has assumed a key position in the overall policy, being one of the twelve thrust areas as well as appears in other thrust areas as a basic requirement [1].

The transdisciplinary and inter-sectoral nature of the subject of SCP and the complex governance framework of Sri Lankan education sector signify that the successful implementation of the SCP education policy would largely depend on the degree of effective coordination and cooperation among ministries and agencies in synergizing the efforts, pooling the resources and sharing the responsibilities. In particular, the implementation of the policy requires translation of the policy elements to doable actions through the formulation of laws, regulations and legislations by the relevant authorities. Accordingly, it is imperative that the SCP education policy framework is an integral part of the hierarchical model recommended in the draft national policy on SCP for implementation (see Figure 5.1).

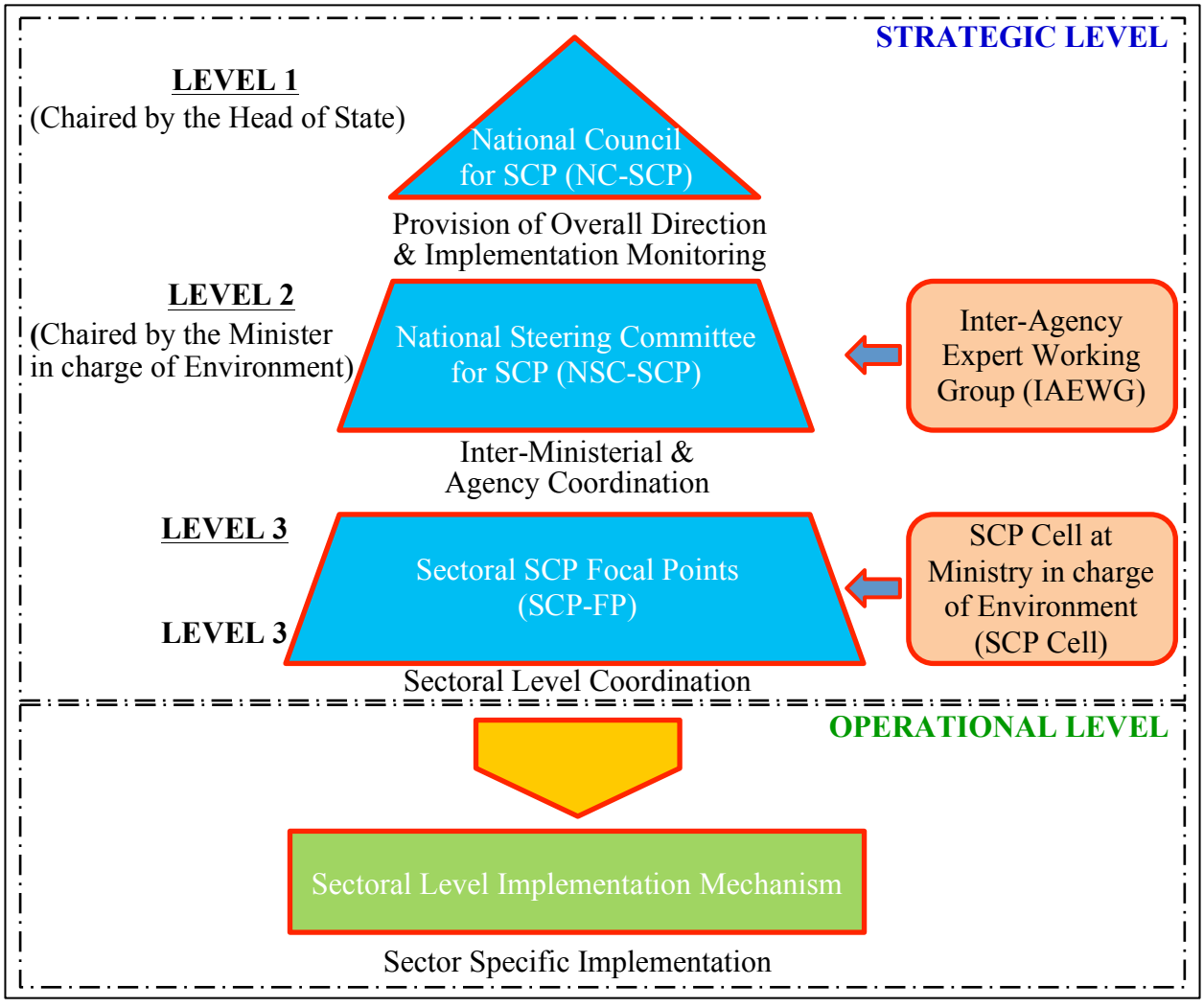
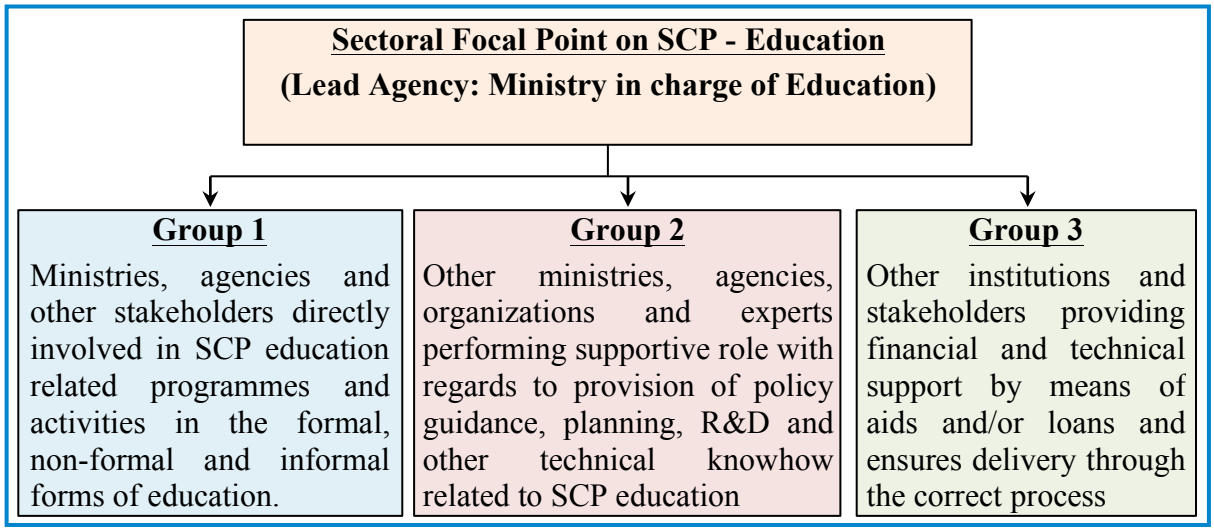


Figure 5.2: Implementation & monitoring framework for the national policy on SCP

The above strategic policy framework on SCP would not only assure the commitment and endorsement by the top-level political leaders but also enable the policy makers and authorities in the education sector to bring about the coherence and consistency with the other sectoral policies, which is imperative to ensure that different stakeholders concerning SCP education work together for the common goals and results. This is basically achieved through the establishment of the focal point for the education sector at Level 3 of the framework, comprising of key players who are involved with SCP related education activities in three groups with specific but interrelated roles, as illustrated in Box 5-1.

Box 5-2: Sectoral Level Coordination – SCP Education Sector



It should be noted that the hierarchical model recommended above for policy implementation is essentially at strategic level and the implementation of various operational level programmes, projects and activities would be through sectoral level implementation mechanisms as decided by respective implementation organizations (main aspects of which are covered in the next section). Even so, the formulation of the programme of activities (or overall action plan) to meet the set policy goals can be best performed by the SCP Education Sector Focal Point at Level 3 within the strategic level framework. In fact, one of the policy goals set in the education sector of the draft national policy on SCP is "an action plan developed within one year of approving this policy". The action plan should be prepared by considering each policy goal, outlining activities and tasks, together with the related timeframe, resources, responsibilities, etc., clearly defined. This effort should be guided by the clear understanding of the findings of the initial stages of the strategic framework including situational analysis (local, regional and international), country priorities & targets, and policy framework.

As a matter of fact, the SCP education plan proposed here is one such effort, which addresses primarily the policy goal "SCP introduced to the early childhood education, school education, university education, vocational education and professional education systems as a life skill before 2025".

5.2.3 Legislative and Regulatory Framework

The introduction of a new subject area particularly into the formal education system needs thorough consideration of many aspects of education, thus subjected to thorough legislative and regulatory system. Hence, a properly devised legislative (and regulatory) framework could provide an effect to any aspect of SCP education policy interventions proposed including communication of the policy decisions to relevant implementers. Such a framework would also ensure the passable institutional and administrative support at different levels of the formal education system as well as the allocation and utilisation of resources required for practical implementation of the SCP Education plan programme. Another important aspect of the legislative framework is the standardisation and quality control, such that the knowledge, skills, attitudes and values created at different levels of education are in fact aligned with the SCP education policy principle and contribute to the attaining of the relevant policy goals collectively. Further, it could provide a mandate to collect and submit information required monitor the progress and also give effect to international commitments such as nationally determined contributions (NDCs) related to GHG mitigation and ESD in general.

The legislative framework of the SCP education plan programme has to be set in conjunction with flexible mandates, such that there is no undue burden on the education system, and should also be complemented by voluntary schemes for allowing room for localisation and rationalisation. Such receptivity would allow different key players (including teachers, teacher trainers, curriculum developers, education policy makers and authors of educational materials) to access and use it in a great many ways, thus providing opportunities for optimisation and continuous improvements.

5.2.4 Strategic Areas of Interventions

Once the policy, institutional and legislative frameworks are identified, the most critical stage of the SCP education plan programme is to identify other strategic areas of interventions for best achievement of its policy goals. The interventions could be formulated under the following themes:

- Curricula, teaching and learning materials/environment
- Capacity of educators
- Stakeholder empowerment
- Partnerships, networking and showcasing.

5.2.5 Forms and Levels of Education

As SCP education a complex phenomenon representing lifelong learning and requiring transdisciplinary and inter-sectoral approaches, segmentation of the education sector would be a way forward for identifying both common and specific interventions required in different types and layers of education. One broader way to categorise the forms of education is as formal, non-formal and informal education (see Box 5-2) [2]. Although the introduction of the SCP concepts to the formal education system is central, development of SCP as a life skill emphasises the need to encompass non-formal and informal education too into the overall plan. Such integration would help to get recognition of non-formal and informal learning pathways as alternative and complementary prerequisites for successful learning of SCP. It is expected that inclusion of all forms of learning into SCP education plan will integrate broader sections of the population into the learning process, thus promoting lifelong learning for all.

Box 5-6: Forms of education

INFORMAL

Informal education is learning that occurs in daily life, in the family, in the workplace, in communities and through interests and activities of individuals. In some cases, the term experiential learning is used to refer to informal learning that focuses on learning from experience.

NON-FORMAL

Non-formal learning is learning that has been acquired in addition or alternatively to formal learning. In some cases, it is also structured according to educational and training arrangements, but more flexible. It usually takes place in community-based settings, the workplace and through the activities of civil society organisations.

FORMAL

Formal learning takes place in education and training institutions, is recognised by relevant national authorities and leads to diplomas and qualifications. Formal learning is structured according to educational arrangements such as curricula, qualifications and teaching-learning requirements.

In line with the general education system in Sri Lanka and the International Standard Classification of Education (ISCED) of UNESCO, a set of broader levels within formal education system is identified for the formulation and implementation of activities of the SCP education plan, a brief description of each is presented in Table 5.1 [3], [4]. The first level includes both early childhood care and education (usually for age from 0 to 2 years) and pre-primary education (usually for age from 3 to 4 years).

Table 5.1: Levels of formal education system

▪ Early Childhood Education
- Typically designed with a holistic approach to support children's early cognitive, physical, social and emotional development, introduce young children to organised instruction outside of the family context and develop some of the skills needed for academic readiness and prepare children for entry into primary education - Age: 0 to 5 years - Provided in day-care centres, nurseries, pre-schools and Montessori.
▪ Primary Education
- Typically designed to provide students with fundamental skills in reading, writing and mathematics (i.e. literacy and numeracy) and establish a solid foundation for learning and understanding core areas of knowledge, personal and social development, in preparation for secondary education. - Age: 6 to 10 years - Provided in primary schools (Grade 1 to 5).
▪ Secondary Education
- Designed to lay the foundation for lifelong learning and human development, and organised around a more subject-oriented curriculum, introducing theoretical concepts across a broad range of subjects; in preparing for labour market entry as well as tertiary education. - Age: 11 to 18 years - Provided in secondary schools (Grade 6 to 13).
▪ Tertiary / Higher Education
- Builds on secondary education and often designed to provide participants with academic and/or professional knowledge, skills and competencies, leading to a degree (bachelor, master or doctoral) or equivalent qualification in specialised fields. It aims at learning at a high level of complexity and specialisation. Programmes are typically theoretically-based but may include practical components and are informed by state of the art research and/or best professional practice. - Age: Usually 19 years and above - Offered by universities and equivalent tertiary educational institutions.
▪ Technical & Vocational Education
- Designed for learners to acquire the knowledge, skills and competencies specific to a particular class of occupations or trades, and may have work-based components (e.g. apprenticeships, dual-system education programmes). Successful completion of such programmes leads to labour market-relevant vocational qualifications acknowledged as occupationally-oriented by the relevant national authorities and/or the labour market. This level programmes may commence at the level of lower secondary education, and structured around the stage of development up to a first-degree level with opportunities for lateral entries at different levels. - Age: 10 years and above - Offered by technical colleges, vocational training institutes and universities.

As early childhood education is the most important period in an individual's life as growth during this period is very rapid and fundamental to future development, the SCP education plan should take an integrated approach aiming at the total development of the child, with due consideration of the role of the parents and family and the psycho-social atmosphere of the home. It should be noted that the formal education at this level has to be complemented by means of non-formal and informal education too, the need of which becomes more vital as the early childhood education system in Sri Lanka is not well-structured and managed.

The primary and secondary education levels refer to the general education at schools from Grade 1 to Grade 13 (age 6 to 18 years), which could be further broken into more stages as primary, junior secondary, senior secondary (for GCE O/L), and post-secondary or collegiate (for GCE A/L). Identification of this structure is important to identify the opportunities for the introduction of the SCP education plan to the school education system in Sri Lanka. In par with this, a fraction of the children moves away from general education to technical & vocational education, which is primarily regulated and managed by a separate administrative structure from the cabinet of ministered level. This category has opportunities for lateral entries at different levels. Finally, the tertiary and higher education represent the programmes leading to degree level (both undergraduate and postgraduate) qualifications. The most visible initiatives in the SCP related education programmes and activities in Sri Lanka are in this sector of education, largely due to the availability of expertise and flexibility in curriculum revisions and management of programmes. Therefore, the introduction of SCP education plan would be more feasible at this level, and thus for piloting the programme.

The above classification of formal education is primarily based on the attributes such as educational properties, institutional context, entrance age and requirements, target group, programme duration/intensity, educational attainment and regulatory framework. Accordingly, another distinct process of education materialised at a higher level could be identified, which is usually referred to as Continuing Professional Education (CPE) or Continuing Professional Development (CPD). This represents advanced professional or vocational education by which professionals maintain, improve and broaden their knowledge and skills and develop the required personal qualities and competencies. Some instances of these programmes are recorded under tertiary education, but in the case of SCP education plan, it is considered as a separate category by considering the differences in its attributes.

5.2.6 Academic Disciplines

Further to the levels of formal education presented in the previous section, another guiding factor to be considered in formulating the SCP education plan, particularly its scope of activities, is the discipline (or field) of education, which represents the broad domain, branch or area of content covered by an education programme. In Sri Lanka, such classification is not applicable in the lower level of formal education systems, such as early childhood

education or primary education, and more noticeable at higher levels such as post-secondary (four disciplines: Science, Commerce, Arts and Technology) [4], tertiary, vocational and CPE (many disciplines). Internationally, UNESCO has designed a classification system to describe and categorise fields of education and training at the secondary, post-secondary and tertiary levels of formal education. The classification is based on a three-level hierarchy between broad fields (the highest level), narrow fields (the second level) and detailed fields (the third level), and there are 11 broad fields, 29 narrow fields and about 80 detailed fields [5]. In line of these, following broad categories are used to identify the academic disciplines, where appropriate, in the SCP education plan in Sri Lanka:

- Arts, humanities, social sciences, journalism and information
- Natural, life and formal sciences
- Engineering, technology and applied sciences
- Health and welfare
- Business, administration and law
- Services (Personal, security, transport)
- Generic programmes (e.g. literacy & numeracy, personal skills) and education science.

It should be noted that there are inter-disciplinary or broad programmes and qualifications, which combine several detailed fields of education and training, where no single discipline dominates.

5.2.7 SCP Curriculum

Once the education forms, levels and academic disciplines are recognised, next task is to develop a curriculum for the SCP education programme. A curriculum of an education programme basically comprised of core competencies (CCs) and programme learning outcomes or programme outcomes (POs) or learning outcomes (LOs), instructional methods, teaching and learning materials and assessment methods. As these aspects depend on the level of education as well as the discipline/subject area, each course/programme needs a specific curriculum. However, as the concept of SCP should be deep-rooted to the life of everybody, a set of generic CCs and subject themes could be identified, based on which specific competencies (SCs), subject areas / topics for curriculum of each programme could be formulated.

I. Core competencies

CCs are general statements that describe the essential knowledge, skills, attitudes and values necessary for the practice of SCP in the professional, educational, and other life contexts and eventually make SCP a life-skill. These competencies exceed the typical boundaries of a specific education programme or discipline; are independent of the subject topics, and matter both at the individual and societal level. They provide the framework of an overall SCP approach and the building blocks for effective SCP practice. This framework applies across

all categories and levels of education from early childhood to adulthood and therefore represents a single frame of reference for the competencies in the whole SCP education plan programme. It should be noted that the central to the concept of SCP is lifelong learning and all the competencies that need to be nurtured cannot be provided only by initial education as

- competencies develop and change throughout the lifespan, with the possibility of acquiring or losing competence as one grows older;
- the demands on individuals can be expected to change throughout their lives as a result of transformations in the social and economic structures as well as the technology, and
- competency development does not end at childhood but continues through the adulthood.

A framework of key competencies consists of a set of specific competencies, bound together in an integrated approach. The framework used in this methodology relates to individual competencies, rather than to the collective capacities of organisations or groups. However, the sum of individual competencies also affects the ability to achieve shared goals (Figure 5.2).

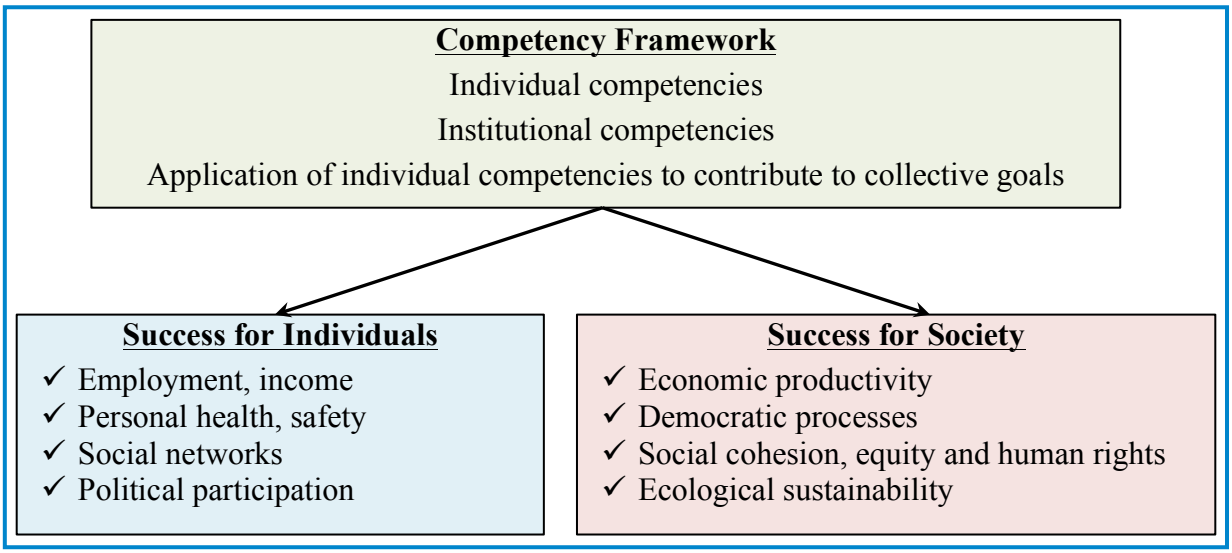


Figure 5.2: Individual and collective goals and competencies [6]

There have been different approaches to the selection, inclusion and translation of key competencies into discipline-based school subjects or interdisciplinary cross-cutting curriculum domains. There have been multiple, diversified perspectives from different academic disciplines. However, in the context of ESD, multiple perspectives from various academic disciplines have moved towards interdisciplinary insight and common understanding of key competencies, centred on four pillars of learning - learning to know, learning to do, learning to be and to live together.

II. Programme outcomes

POs are statements that describe what learners will know and be able to do when they complete an education programme, thus are closely linked to the competencies (Box 5-3). However, POs are different from competencies that they describe performances that require one to integrate and apply one's learning. They do not break into domains such as knowledge, skills, attitudes and values, and describe learning that is significant and durable – learning that really matters in the long term. A program outcome must be observable and measurable and must communicate a single outcome rather than combine multiple outcomes into a single statement.

Box 5-10: Definitions of programme learning outcomes

- Definition 1

Programme learning outcomes represent culminating demonstrations of learning and achievement. In addition, learning outcomes are interrelated and cannot be viewed in isolation of one another. As such, they should be viewed as a comprehensive whole. They describe performances that demonstrate that significant integrated learning of the program has been achieved and verified.

- Definition 2

Programme learning outcome is an acceptable, culminating demonstration of learning which occurs in an authentic performance context and really matters in the long run.

III. Subject themes

The following subject themes have been identified for the SCP education plan based on the trust areas of the draft National SCP Policy for Sri Lanka, UNEP's thematic priorities and other related international programmes on ESCP and ESD in general [1, 7, 8]:

- Diversity and inclusion (values, cultures and living conditions)
- Demographic structures and socio-economic developments
- Politics, advocacy and governance
- Globalisation and sustainability
- Inequality, poverty, social security and rural development
- Human rights, conflicts, corruptions and peace
- Basics of SCP
- Environment, natural resources and their protection (air, water, minerals, metals, etc.)
- Energy and sustainability
- Science and technological progress
- Industry, production, services and trade
- Consumption and the environment
- Consumer rights and responsibilities
- Education and communication
- Research and innovation (change management)

- Food and agriculture
- Health and safety
- Mobility, urban development and traffic
- Global environmental changes/issue

5.2.8 Roles and Responsibilities of Stakeholders

Further to the policy and institutional frameworks presented in Section 5.2.2, the roles and responsibility of the actors and other key stakeholders of the implementation of SCP education plan, particularly at the operational levels, have to be identified. The stakeholders identified during the consultative workshops of the SCP education policy development have been enhanced to obtain the list presented in Table 5.2.

Table 5.2: Stakeholders of SCP education plan programme at operational levels

▪ Lead Organization
- Ministry in charge of Education, Government of Sri Lanka.
▪ Supportive Organizations – Central Government
- Line Agencies of Ministry in charge of Education - Ministry in charge of Higher Education and line agencies - Ministry in charge of Mass Media & Communication and line agencies - Ministry in charge of Skill Development, Vocational and Tertiary Education and line agencies - Other relevant Ministries, line agencies and relevant organizations.
▪ Supportive Organizations – Local Governments
- Ministry in charge of Education - Line Agencies of Ministry in charge of Education - Other relevant Ministries, line agencies and relevant organizations.
▪ Other stakeholders
- Organizations related to formal education including early childhood education - Organizations related to non-formal and informal education, including media - Professional associations - Individual experts, educators and trainers - Related industry / private sector organizations - NGOs, CBOs, social groups and individual citizens - Global partnerships and networks.

For each of the programme in SCP education plan, relevant actors and stakeholders could be identified from the list provided and their roles and responsibilities have to be identified as a part of the implementation plan.

5.2.9 Monitoring Framework

It is crucial to develop framework to monitor and evaluate (M&E) the progress of the SCP education plan programme and the various related initiatives once implemented for all the

forms of education (formal, non-formal and informal) systems. A key aspect of this is the identification of suitable and relevant indicators for each initiative and programme. As ESCP places emphasis on integration to existing educational programmes, it is crucial for each programme to set up its own objectives, outcomes and indicators within the SPC education plan. There are three different types of M&E that can be employed as given in Box 5-4.

Box 5-4: Monitoring framework for SCP education plan programme

Compliance monitoring (focusing on inputs)	**Diagnostic Monitoring (focusing on processes)**	**Performance Monitoring (focusing on outputs)**
This is a bureaucratic type of monitoring to ensure that the educational institutions comply with predetermined standards and norms set by rules and regulations. It is mainly focused on educational input of teachers, textbooks, classrooms, teaching equipment etc.	This type of monitoring focuses on the instructional processes relating to what happens in the classroom and whether the students are actually learning what they are supposed to learn. This would give insightful information on explaining the quality of education provided by the educational institutions	The emphasis of this kind of monitoring is on the academic achievement of the students through testing to see what results have been yielded by the

5.3 SCP Educational Plan Programme

5.3.1 SCP Educational Goals

The transformational change of human behaviour and lifestyle, while promoting resource and energy efficiency, sustainable infrastructure, and providing access to basic services, is the basis for SCP. The education is the key to achieving this societal change. Education for SCP aims at enhancing values, knowledge, skills and attitude changes that encourage responsible consumption while ensuring sustainable production. The framework proposed in the education sector SCP policy, establishing policy principle, policy statements and policy goals (as given in Section 1.4.2), paves a sound foundation to the development of SCP education plan for Sri Lanka.

Development of curriculum for a particular study programme is a well-established procedure. Usually, such a programme has a particular target group and at least fairly defined subject list. The multidisciplinary, as well as interdisciplinary perspectives and cross-curricular focus of ESCP, require advancing the values, knowledge, skills and attitudes of the learners in all the subject areas of the curriculum. Accordingly, SCP principles and concepts cannot be delivered from a set of specific subjects, but need to shape and integrate into all the subjects in the curriculum. Therefore the SCP education plan for Sri Lanka is fundamentally framed around the concept of common core module for a given sector of education, for example tertiary/university, where depending on context and need different educational programmes could extract the relevant elements to introduce or integrate into the existing curriculum.

5.3.2 Governance & Management

Planning and ensuring the effective implementation of SCP education plan programme as well as organising and operating the plan are central. Accordingly, key elements are identified for the governance and management framework of the SCP education plan programme for Sri Lanka.

- Regulatory framework
- Institutional framework
- Management plan
- Monitoring framework
  - Performance indicators (input, process, output, outcome and impact)
  - Means of verification
  - Monitoring and reporting
  - Evaluation & impact assessments
  - Feedback system for continuous improvements.

The essential attributes of these aspects are presented in Section 5.2.

5.3.3 Education Methodologies

The unique aspects of the SCP education plan, its curricula and the CCs required a demand for effective and innovative educational methodologies in relation the areas such as teaching/ learning environment (outcome base education), use of information and communication technologies (ICT), evaluation, and also research & innovation for continuous improvements. Some of the key areas for the improvements and tools for effective teaching and learning include:

- Lectures, seminars, tutorials
- Dialogue and discussion
- Use of the Internet / ICT; Use of media
- Projects and Case studies
- Future workshops; Showcasing; Networking; Field trips
- Drama and games; Music, art and literature; Mind maps.

The evaluation itself should be framed accordingly, which could be carried out in collaboration with students using self-evaluation, peer evaluation and other methods.

5.3.4 Core Competencies (CCs)

The competencies and programme outcomes provide the foundation for the development of the SCP education curriculum, which are centred around outcomes-based framework where knowledge, skills, attitudes and values are cross-referred to four pillars of learning - learning to know, learning to do, learning to be and to live together as well as the four core programme outcome areas - global citizenship, environmental stewardship, social justice, ethics and wellbeing; and future-thinking. The CCs and programme outcomes presented in

this section are not prescriptive, and it is important to modify or adapt them as appropriate to the category and level of education as well as discipline or interdisciplinary context and specific subject areas. In line with the above, the CCs are identified under the following three key domains, as listed in Table 5.3:

Table 5.3: Core competencies of the SCP education plan of Sri Lanka

▪ **Cognitive Competencies (Knowledge) → Leaning to Know**
1. **Information competency**: the ability to access, acquire and process information on topics of SCP such as globalisation, development, use of natural resource, energy and their socio-environment impacts
2. **Systems thinking competency**: the abilities 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.
3. **Critical thinking competency**: the ability to question norms, practices and opinions; to reflect on self-values, perceptions and actions; and to take a position in the sustainability discourse.
▪ **Methodological or Functional Competencies (Skills and know-how) → Leaning to do**
4. **Anticipatory competency**: the abilities 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.
5. **Strategic competency**: the abilities to collectively develop and implement innovative actions that further sustainability at the local level and further afield.
6. **Integrated problem-solving competency**: the overarching ability to apply different problem-solving frameworks to complex sustainability problems and develop viable, inclusive and equitable solution options that promote SCP, integrating the above-mentioned competences.
▪ **Attitudinal Competencies (Behavioural and Values) → Leaning to be**
7. **Normative competency**: the abilities to understand and reflect on the norms, behaviours and values that underlie one's actions; and to negotiate sustainability values, principles, goals, and targets, in a context of conflicts of interests and trade-offs, uncertain knowledge and contradictions.
8. **Collaboration competency**: the abilities 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.
9. **Self-awareness competency**: 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.

- Cognitive competencies (knowledge), which include critical understanding of global, national, and local context of SCP and related socio-environmental issues;
- Methodological (or functional) competencies (skills and know-how), which reflect the acquisition of skills, strategies, techniques, and procedures for decision-making and taking actions related to SCP
- Attitudinal competencies (behavioural and values), which describe the moral conception and ethical attitudes which encourage new behaviours and values coherent with sustainability, implying the evolution of a new type of ethic that encompasses different spheres of human interaction in society, with institutions and with the whole group of biological and physical systems.

5.3.5 Programme Outcomes (POs)

The list of POs identified in the SCP education plan programme is presented in Table 5.4.

Table 5.4: Programme outcomes of the SCP education plan of Sri Lanka

After completion of the education programme, the learner should be able
1. To envision scenarios for a desirable future and promoting work with different visions and scenarios for such alternative and future changes needed for ensuring SCP.
2. To identify and connect the ecological, economic, and social dimensions of problems, conceiving conditions for systems thinking to work and live with complexity in supporting SCP.
3. To experience a sense of belonging to a common humanity, sharing values and responsibilities and take actions to build the behaviours, values and practices of the community for sustainable lifestyles.
4. To contextualise a problem or action associated with SCP with consideration of the different dimensions (spatial – local/global and temporal – past/present/future).
5. To create the conditions for critical thinking and analysis to question assumptions and to recognise and respect different trends and views in different situations.
6. To participate actively in functioning for change and decision-making; applying the knowledge into practice; sharing responsibilities and engaging in joint action.
7. To engage in life-long learning approaches, with emphasis on interdisciplinarity and innovation.
8. To manage emotions and concerns as a means to reach a deeper understanding of problems and situations.

5.3.6 SCP Thematic Areas and Subject Topics

The list of thematic areas selected for the SCP education plan is presented in Section 5.2.7. These themes reflect topics, which may be considered to have a broad relevance to the purposes of specific SCP education programmes and their wider context in the society. A list

of more specific subject topics under each thematic area is presented in Annex 1. Yet again, this list too represents some indicative subject topics and not comprehensive enough to capture the entire scope of the respective theme. When the subjects are embedded within the curriculum and form an integral part of a programme of study, learning and teaching activities are designed to take them into account. The topics of the themes as well as subjects given are not prescriptive, recognising that educators will be working within different local contexts, governed in some cases by broader institutional strategies, thus need more flexibility.

5.3.7 SCP Education Plan for Specific Education Sector – An Overview

The SCP education plan programme for Sri Lanka is targeted for all the sectors (i.e. forms and levels) of education covering formal, non-formal and informal forms and early childhood to tertiary/university and adulthood levels, as described in Section 5.2.5. Each of these sectors is required to contribute to the SCP education plan programme. The distinctly different features of these sectors demand specific attributes in the curriculum of the SCP education plan. In particular, CCs, POs, subject themes and topics presented above for the overall plan have to be refined and tailored to suit each of the education sectors. Accordingly, following requirements are established as guiding principles in developing sector-specific SCP education plan and curriculum:

- The specific education sector should demonstrate its contribution to SCP education plan as well as the connectivity of their concepts and activities;
- The sector/subject-specific competencies (SCs) should be established, aligning with the nine core competencies (CCs);
- The sector/subject-specific learning outcomes (LOs) should be established, aligning with the eight programme outcomes (POs); and
- The sector-relevant subject topics should be identified under each of the twenty SCP thematic areas.

The SCs, LOs and list of subjects lay the foundation for the development of curriculum for each sector. Typically, each study programme in each of the education sector has a specific curriculum comprising of a set of subjects to cover the topics identified to develop relevant competencies and programme outcomes, and each subject has several sub-topics and few subject-specific LOs. However, the fundamental approach of the curriculum development of the SCP education plan programme in Sri Lanka is different and unique, due to the fact that SCP is a theme cutting across all the subjects and the diversity, as well as inclusion (i.e. unity and connectivity), is central. Accordingly, each of the following levels of formal education sector should be able to apply the concept of the common core module on SCP:

a. Early childhood education
b. Primary education

c. Secondary education
d. Tertiary/University education
e. Technical & Vocational education
f. Continual professional development.

The concept of the common core module is not applicable for the SCP education in non-formal and informal sectors due to the less structured forms and diversity. More specific curriculum for different target groups may have to be developed, which is not covered in this study. However, the importance of non-formal and informal educational methodologies as supplementary and complementary means of enhancing the effectiveness of above formal sectors are well recognised.

The overall framework of the above approach is presented in Figure 5.3. The application of this methodology is illustrated for the tertiary/university level of education in the next section. A similar approach could be used in other formal education sectors too, and therefore only the key guiding sectoral features are presented in this report.

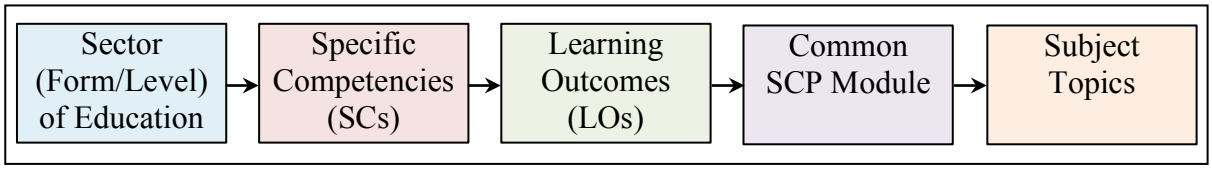


Figure 5.3: Overall framework of the SCP education curriculum for a given sector

5.3.8 SCP Education Plan for Tertiary/University Education

I. Contribution of the tertiary/university education curriculum to ESCP

Although SCP education supposed to be a continual process of learning from early childhood, the introduction of the concept of Sri Lankan education system would be most practical and prompt to tertiary/university education (relative to the other sectors) at this juncture due to several reasons, including:

- Availability of local human resources, expertise and potential for capacity building
- Physical resources and potential for enhancement
- Flexibility and autonomy for curriculum changes
- Experience and exposure
- Partnerships and networks
- Diversity of the disciplines and subject areas
- Relevancy to the subject themes/topics identified in SCP education plan
- Manageable sizes of learner groups.
- Demonstrate tangible outputs in short time frame

Another motivation arisen from above features is that the applicability of CCs, POs and list of subject topics identified for the SCP education plan could be best tested and verified with the tertiary/university education sector.

However, there are challenges too for the development of the SCP education plan in tertiary/university education sector, particularly arisen from the diversity itself. The diversity in disciplines, study streams and subject topics will impose a fundamental challenge of the development of the curriculum for a common core module in SCP, having a common set of sector-specific competencies and learning outcomes.

II. Core competencies and sector-specific competencies

A list of CCs and related sector-specific competencies for the tertiary/university education is presented in Table 5.5.

Table 5.5: Core competencies and specific competencies in tertiary/university education

Core competencies	Specific competencies
1. Information competency	Search, access, acquire and compile information on SCP related topics from diverse sources and process them.
2. Systems thinking competency	Recognise behaviour and inter-relationships of complex SCP systems across different domains (society, environment, economy, etc.) and across different scales (local, regional to global) and analyse them by considering systemic features.
3. Critical thinking competency	Challenge norms, assumptions and conventional wisdom in reflecting self-values, perceptions and actions to take a stand in SCP discourses.
4. Anticipatory competency	Comprehend, evaluate and shape situations of multiple future scenarios of SCP to form self-visions for a sustainable future.
5. Strategic competency	Collectively design and implement interventions and governance strategies with the sophistication necessary to address SCP challenges at the local level and beyond.
6. Integrated problem-solving competency	Master different problem-solving methodologies related to complex and diverse issues of SCP to develop locally applicable, inclusive and equitable solution options.
7. Normative competency	Elaborate and articulate self-values, -norms and -behaviours to negotiate concepts and principles of SCP, in a context of conflicts of interests and trade-offs, uncertain knowledge and contradictions.
8. Collaboration competency	Collectively plan and perform actions with other learners through collaborations, active participations and consultations.
9. Self-awareness competency	Develop and justify the own personal options for a sustainable lifestyle in line with the principle of SCP

III. Thematic areas and subject/topics

In the case of tertiary/university education sector, most of the subject topics presented in Table 5.3 would be relevant at least one disciple or study area. Therefore the list of subject topics related to each thematic area presented in Table 5.6 is indicative ones and the more comprehensive list would be more rational.

Table 5.6: Thematic areas and subject/topics in tertiary/university education curriculum

Thematic area	Subject topics
1. Diversity and inclusion (Values, cultures and living conditions)	Human Behaviour, Culture, Lifestyles, Sufficiency & modesty, Indigenous knowledge, Consumerism, Societal transformation
2. Demographic structures and socio-economic developments	Demographic dynamics and sustainability, Human dimensions of natural resources, Socio-Economic models and practices, Urban development, Economic diversification and sustainable development
3. Politics, Advocacy and Governance	Sustainable development and global agenda, Environment governance, Active citizenship, Social empowerment, Local policy initiatives, regulations and commitments
4. Globalization and sustainability	Global interdependence, World citizenship, International trade and sustainability, Sustainable globalization, Governance and SCP
5. Inequality, poverty, social security and rural development	Social security and sustainable development, Economics of Poverty, Inequality and Wealth Accumulation, Rural development and social protection, Inequalities, demographic diversity and environmental degradation
6. Human rights, conflicts, corruptions and peace	Good governance, Transnational democracy, Human/Children/Fundamental rights, Social justice
7. Basics of Sustainable Consumption and Production (SCP)	Guiding principles of SCP, Life-cycle thinking, Rebound-effect. Global initiatives, networks, partnerships and resources,
8. Environment, Natural resources (air, water, minerals, metals, etc.) and their protection	The environment and the Bio-sphere, The climate, Environmental cycles, Natural resources/ indigenous resources, Biodiversity and Ecosystem services, Planetary boundaries, Ecosystem ecology, Industrial ecology, Circular economy, Environment management
9. Energy and Sustainability	Global energy balance; Global energy supply and demand; Energy, Environment Economics & Policy; Sustainable energy; Renewable energy; Energy storage; Energy efficiency, conservation and management; Energy poverty; Energy access
10. Science and technological progress	Science & Technology, Society and Sustainability; Scientific knowledge base on global environment and related issues; Sustainability assessment tools; Green technologies; Sustainable built environments; Green chemistry; Innovation and Technology Transfer;

11. Industry, production, services and trade	Industrial revolutions and development; Production/Manufacturing and trade; Resource Efficiency and Cleaner Production; Life-cycle assessments; Chemical Leasing; Sustainable design; Sustainable procurement; Sustainable marketing; Sustainable supply chain management; Sustainable tourism;
12. Consumption and the environment	History of consumption; Human behaviour and consumption; Consumer choice, commodities and product diversity; Sustainable consumption; Advertising and persuasion
13. Consumer rights and responsibilities	Consumer protection policies; Consumer rights to information; Consumer information / green labels; Conflict resolution
14. Education and communication	Education for All; Right to education; Knowledge management cycle; Sustainability and the Information; Digital literacy; Media literacy; Media ethics; ICT and education; SCP as a life-skill; ESD;
15. Research and innovation (change management)	Creativity and innovation; Future perspectives of technological innovations; Social innovation for sustainability; Innovations and Entrepreneurship; Eco-Innovations; Principles of Urban Symbiosis; Circulatory Material and Resources; Energy Technology Innovation; Digital lifestyle innovation; Internet of Things
16. Food and agriculture	Global/local food production; Food security / Sufficiency; Sustainable production and processing of food; Sustainable plantation crops and agroforestry; Product branding, labelling & certification; Ecological, organic food
17. Health and safety	Health and sustainability; National health care and social services; Healthy lifestyles; Food safety; Lifestyle illnesses; Product safety
18. Mobility, urban development and traffic	The historical development of mobility; Environment dimensions of transportation; Transport sector, air pollution and climate change; Environmentally sustainable transportation (EST); Sustainable transport infrastructures; Mass transport; Non-motorized transportation; Sustainable urbanisation, Green cities and sustainable mobility; Cleaner fuels and vehicles
19. Global environmental changes/issues	Global environmental impacts of development; GHG emissions, climate change, mitigation, adaptation; UNFCCC and history of Climate Change Negotiations; Global climate actions; National circumstances
20. Waste and hazardous materials	Development, lifestyle and waste; Waste management principles/ waste management hierarchy / 3R; Life Cycle Thinking and waste management; Zero-waste materials, processes and technologies; Municipal solid waste; Medical waste; Hazardous waste; e-Waste; Polluter-pay principle

IV. Thematic areas and learning outcomes

A list of thematic areas and related LOs in the tertiary/university education is presented in Table 5.7. These LOs have to be revised according to the topics selected for a SCP module.

Table 5.7: Thematic areas and LOs in tertiary/university education curriculum

Thematic area	Learning Outcomes (LOs)
1. Diversity and inclusion (Values, cultures and living conditions)	Demonstrate appreciation and respect for cultural difference and diversity, cultivate empathy and solidarity towards other individuals and social groups, and take actions to promote (and practice) sustainable lifestyles.
2. Demographic structures and socio-economic developments	Recognise and debate the change of the life situations with respect to the socio-economic and demographic conditions.
3. Politics, Advocacy and Governance	Analyse, assimilate, interpret and substantiate the governance structures, decision-making processes and dimensions of citizenship (legal, political, identity)
4. Globalization and sustainability	Identify and critically analyse the social, environmental, and economic dimensions of sustainability using holistic approach focused on connections between complex human and natural systems
5. Inequality, poverty, social insecurity and rural underdevelopment	Appraise the causes and impacts of social and economic injustice (inequality, poverty) and resulting challenges for sustainability
6. Human rights, conflicts, corruptions and warfare	Relate global injustice (e.g. children rights; conflicts) to development issues and related sustainability challenges
7. Basics of Sustainable Consumption and Production (SCP)	Rationalise the underpinning principles of SCP and the related concepts such as life-cycle thinking, systemic approach, rebound effects, etc.
8. Environment, Natural resources (air, water, minerals, metals, etc.) and their protection	Assess the exploitation of natural resources, related diverse environment impacts and methods of solution for protection.
9. Energy and Sustainability	Appraise development-energy-environment interconnectivity and its implication on SCP
10. Science and technological progress	Reflect the influence of science and technology progress on lifestyles and sustainability, and its ambivalence
11. Industry, production, services and trade	Elaborate the socio-economic and environmental dimensions of business and industry, and appraise the immerging sustainability concepts/models in the sector
12. Consumption and the environment	Use real-life examples to demonstrate the impacts of consumption of goods and services on global resource use and environmental
13. Consumer rights and responsibilities	Rationalise the central role of consumer rights and responsibilities in realising SCP.

14. Education and communication	Appreciate the role of education and communication on knowledgeable, informed society and sustainability
15. Research and innovation	Depict the power of research, creativity and innovation in systemic change and sustainability
16. Food and agriculture	Evaluate and integrate varying perspectives on issues related to food and agricultural systems in the context of SCP
17. Health and safety	Identify and assess health and safety issues of development and lifestyle change
18. Mobility, urban development and traffic	Compare and contrast the performances of different transport modes and propose alternative sustainable transport systems.
19. Global environmental changes/issues	Explain causes, impacts and solutions for global environmental changes, particularly climate change associated with GHG emissions
20. Waste and hazardous materials	Describe basic processes of waste generation and relevant management practices.

V. Recommendations for introduction of the sector-specific SCP education plan

The introduction of a new subject or topic into an existing formal curriculum usually poses challenges due to formalities in the process of curriculum revision. However, this is relatively easier in education programmes in tertiary/university system as the curricula are usually flexible, especially for the introduction of optional subjects. Alternatively, as many topics of SCP are not entirely new, it is less challenging to integrate into existing subjects, where relevant. Accordingly, the options for implementation of sector-specific SCP education plan programme in the tertiary/university education system could be categorised into the following three alternative methods:

- *Entry strategy*, where SCP is mainstreamed as a topic taught as a part of existing subjects/disciplines;
- *Integration strategy*, where SCP is integrated into the curriculum as a specific subject;
- *Harmonisation strategy*, where SCP is taught as a cross-cutting interdisciplinary theme and incorporated into similar courses, projects and other activities across departments, faculties or universities.

All the above methods are practically viable to implement and therefore recommended to consider. Once specific topic or subject is selected from the sector-specific SCP education plan, the relevant SCs and LOs have to be developed, by considering the level of progression, in line with the SCs and LOs specified for the sector. Then the detail syllabus, teaching/ learning methodology, teaching materials and evaluation methodology have to be established.

5.3.9 SCP Education Plan for Early Childhood Education

The SCP education plan programme for Sri Lanka is based on a holistic approach to education for all, envisaging sustainable lifestyles leading to societal transformation for SCP. Such transformative education must begin in early childhood, as education in that level is

about laying a sound intellectual, psychological, emotional, social and physical foundation for development and lifelong learning. Early childhood education, therefore has an enormous potential in fostering values, attitudes, skills and behaviours that support the underpinning principles of SCP, for example, wise use of resources, environment, changing weather, waste, cultural diversity, religion, etc. Thus, early childhood education clearly has an important place in the efforts to bring about SCP.

Early childhood from birth to five years is the most important period in an individual's life as growth during this period is very rapid and fundamental to future development. It is also the period when the child is most vulnerable to external influences. On the other hand, the needs of the child are many and they are interdependent. Therefore, the SCP education plan targeting early childhood education take the holistic approach integrated-curriculum, thematic-oriented teaching and structured subject topics, aiming at the total development of the child, taking into consideration of the role of the parents and family. It is important to note that the most pressing concern in families and communities is children's survival and development that ensure adequate care, protection and stimulation through enlarged access to health, nutrition, sanitation and water provisions. Concern for education, particularly curricular changes, seemed secondary for the majority of the population. Therefore, the introduction of the SCP education plan programme for this sector has unique challenges.

The development of the curriculum of a common module in this sector could follow the same methodology presented above for the tertiary/university education sector, with the selection of appropriate SCs, LOs and subject topics. The subject topics in early childhood education curriculum could include:

- Context sensitive and culturally relevant content;
- Content that fosters caring attitudes and empathy with regard to the natural environment and people;
- Learning about respect for diversity;
- Learning of basic life skills;
- Activities built around the waste management concepts such as reduce, reuse, recycle.

As there is a lack of formal structure in this sector, implementation of the plan needs strategic approach with recognition on strengths of early childhood pedagogies and exploit them fully in the work with young children, e.g. theme-based or project-based interdisciplinary approach to learning; child-centred approach; parental and community involvement; emphasis on holistic learning, whereby children learn with mind and body; use of different languages and senses, e.g. verbal, visual, etc., for making sense of the world, expressing and communicating. In particular, consideration of the role of the parents and family in promoting early childhood development, and create awareness and skills among parents become essential. Allocation of more financial resources, capacity building of teachers, dissemination

of information through advertisements and various means of communication, including ICTs, and development of infrastructure, facilities and institutional mechanisms in provincial/local government framework too are important prerequisites for mainstreaming the SCP in early childhood education in Sri Lanka.

5.3.10 SCP Education Plan for Primary Education

For the continuation of SCP education as a life skill, the experiences of early childhood education learners should become the starting point for new educational programme at primary education in the next level. The institutional framework of the primary education (delivered in schools, from Grade 1 to Grade 5) is more favourable than early childhood education for the implementation of the SCP education plan programme. Among the main subjects areas of the integrated curriculum in primary education (namely, Language, Mathematics, Environment related activities and Religion), Environment related activities are directly relevant to the scope of SCP education. Furthermore, Language, Religion and Mathematics subjects should also demonstrate their contribution to the SCP as well as the connectivity of their concepts, particularly to the nine CCs of the overall education plan. In fact, as ESCP is based upon an integrated set of key principles providing the basic understandings needed to make decisions about complex issues, the learners are required to draw upon, and integrate, concepts from a wide range of disciplines and subject areas.

In relation to the present structure of primary education and the scope of SCP education plan, the subject topics of SCP education plan to be covered at this level of education could be broadly grouped as:

- socio-cultural and natural diversity in the learners' environment,
- socio-cultural and natural diversity in other localities, societies, regions and countries,
- global connections of the learner' lifeworld and society.

The choice of specific subject topics has to be aligned with the specific competencies and LOs. Further, the subject topics have to be linked to the subjects offered in the present curriculum of the primary education for logical connectivity and effective introduction. The introduction of SCP through new subjects will not be very practical and the most effective ways are: firstly to integrate into existing subjects and deliver within their existing classes and secondly as interdisciplinary themes and projects or as separate sessions in addition to existing classes. In particular, the cross-curricular focus of ESCP means that learning in all subjects needs to advance learner's understanding of SCP principles and concepts as relevant to each subject area in the curriculum. Thus the learners need opportunities to consider such issues from interdisciplinary perspectives, which could be best achieved integrating studies of SCP into both individual subjects and through interdisciplinary learning.

The Eco club environment education programme implemented by CEA in primary schools would be an effective entry point for introducing SCP topics to this sector, outside the formal education curriculum.

5.3.11 SCP Education Plan for Secondary Education

The secondary education of eight years, from Grade 6 to Grade 13, is a subject-based curriculum that replaces the integrated curriculum in the earlier stage. As the main emphasis of the education varies over the three sub-levels (Junior secondary level from Grade 6 to Grade 9, Senior secondary level leading to GCE/OL; and Senior secondary level leading to GCE/AL, the secondary education represents the largest segment of the education system. Further, this is expected to serve multiple purposes such as preparing students who enter the world of work either as trainees, wage employees or as self-employed entrepreneurs in diverse areas of disciplines. Therefore, the introduction of SCP education plan is most challenging and critical in this level. However, the strong education structure and the compulsion up to Grade 9 offer a perfect opening for the SCP education to the whole community. Accordingly, a major learning experience of SCP education plan with a significant level of competency development and transformative change in life-skills is expected during the eight years of secondary education.

Another important aspect is that, in comparison to primary education, secondary education in totally contains a wider range of subjects and it is convenient to group them under a number of broader areas based on the subject discipline for the identification of specific competencies and related LOs. One such categorization is as follows:

- Language, literacy and arts
- Social sciences
- Mathematics, natural sciences, technology
- Physical education, sports.

In each of these areas, many possibilities exist to link the acquisition of SCs and to strengthen the CCs. Each specific subject in all the areas needs to demonstrate its contribution to SCP education, link the SCs to the nine CCs of the SCP education plan and identify topics for the twenty thematic areas. As highlighted in primary education section above, the interdisciplinary perspectives and cross-curricular focus of ESCP demand for advancing knowledge and skills of the learners on SCP in all the subject areas of the curriculum. Accordingly, prior to introduction, a thorough review of each subject is required to identify the extent to which the concepts related to SCP is present in the curriculum and up to what topics and what extent that could be integrated through SCP education plan for the sector.

The Environmental Pioneers Programme implemented by CEA and Energy Club programme implemented by SLSEA would be an effective entry point for introducing SCP topics to this sector, outside the formal education curriculum.

5.3.12 SCP Education Plan for Technical & Vocational Education

Technical and vocational education (and training) is another important sector in SCP education plan as it can contribute to economic restructuring through developing effective approaches towards the formulation of relevant SCP related technical skills, knowledge, values and attitudes necessary for a worker for the transition to a sustainable green economy. Although over several decades institutions involved in this sector have grown in number and complexity, with the introduction of the National Vocational Qualifications (NVQ) system, there is a much improved overall institutional structure and governance. The NVQ framework consists of seven levels of instruction: NVQ levels 1 to 4 are for craftsmen designation and successful candidates are issued with National certificates. NVQ levels 5 and 6 are Diploma level, whereas Level 7 is for degree equivalent qualification. Although there is a single framework, the distinct differences in the attributes in these levels, particularly among the three categories of craftsmen, diploma and degree, demand for a comprehensive review of the curricula and methods of delivery of the study programmes for the development of common core module for each of the three categories of the Technical and Vocational education sector. Further, the competencies and LOs relevant to this sector would be significantly different from those in general education sectors, and even that of universities. However, the general framework and method of the approach presented, and illustrated with tertiary/university sector, are applicable. Accordingly, sector specific SCs, LOs and subject topics have to be identified, based on which the curriculum and subject details have to be developed in each of the three categories of craftsmen, diploma and degree.

5.3.13 SCP Education Plan for Continuing Professional Education

As Continuing Professional Education (CPE) or Continuing Professional Development (CPD) represents a framework for lifelong learning in professional life, it plays a significant role in the SCP education plan programme. Presently, a broad range of education and training programmes are conducted in all the disciplines by a variety of state and non-state institutes and organisations. In general, SCP related topics are covered only in environment and industry related CPD programmes, and there is a lack of awareness and capacity in relation to the topic of SCP. However, introduction of SCP topics is more or less straightforward due to the administrative structures and self-governing nature of the CPD programmes. More significantly, development of specific CPD courses on SCP would be very practical and most effective in establishing a critical mass in different professions and discipline for mainstreaming SCP in the society, as well as forming a resource pool for the development and implementation of other programmes in the SCP education plan.

Accordingly, a higher priority should be given to CPE sector in the roadmap and implementation plan of SCP education in the country.

5.3.14 SCP Education Plan for Non-formal Education

Non-formal education is an important and effective means of getting information and developing skills, either over and above the formal means or for those who have no access to formal means in many disciplines. Further, non-formal education provides opportunities to access multi-disciplinary knowledge and information. As such, non-formal education is considered to be a supplementary but essential component of overall SCP education plan programme. Presently, variety of non-formal education programmes are conducted by many organizations in different disciplines but the emphasis of SCP related topics, in general, is not evident. Therefore a greater awareness among stakeholders is required as an essential prerequisite for the promotion of SCP through non-formal education. As the name implies itself, the education methodology of this category differs from all the levels of formal education systems described above and may have different target groups, who do not have access to formal education. Accordingly, the concept of the common module on SCP is not directly applicable to this sector, and need a different approach. Development of specific curriculum for the non-formal sector is not considered in this study. However, utilisation of non-formal methodologies in enhancing the effectiveness of SCP education in all the six sectors considered above is emphasised.

5.3.15 SCP Education Plan for Informal Education

Apart from above education forms and levels, the life skills are developed in greater extents through informal means of education throughout the life. On the other hand, there is a growing demand by adults and young people for the knowledge, skills and competencies acquired in the course of their life experiences to be made visible. Accordingly, the introduction of a core module on SCP with structured framework would cater for the emerging demand for the recognition of informal education, while promoting SCP as a life-skill. More fundamentally, this form provides educational services for all, without age limit or sectoral boundaries and thus cut-across all other forms and levels of education. Therefore, the SCP education methodology for this category should target for complementing/ supplementing the formal (or general) education systems. This is more vital for early childhood education as the present institutional structure of pre-schools poses challenges to introduce more formal programme, and informal education could contribute to filling the gaps.

The competencies relevant to this category may have inherently different outlook but should be linked to CCs derived for the whole SCP education plan. As in the case of non-formal education, the development of a common core module on SCP is not applicable to this form

of education. Another important aspect is to consider is the means of measuring the impact of informal education.

5.3.16 Development of Curriculum and Course Materials for Common Core Module

Once the key elements of the common core module of a given sector of education are identified, the detailed curriculum, together with teaching/learning materials and instructor's manual, has to be developed. In the present study, this is performed for the tertiary/university education sector and will be presented as the second deliverable. For this sector of education, it is recommended to introduce a common core module titled Sustainable Consumption and Production with 15 hours of lectures, equivalent to 1.0 Credits. Basically, the deliverable will have a set of teaching resource package comprising of the following:

- Course Outline;
- Power Point Slides for 15 hours of lectures;
- Tutorials;
- Case Studies;
- Assignments, quizzes;
- Instructor's Manuals;
- Soft copy of references, video etc.

The course outline covers the rationale, subject-specific competencies, learning outcomes, detail syllabus, teaching and evaluation tools/methodology, a list of learning resources and curriculum mapping.

5.4 Capacity Building Requirement

5.4.1 Rationale

The unique approach used in the development of curricula of the SCP Education Plan itself poses many challenges for successful implementation, among which lack of capacity of the key stakeholders is central. Basically, the capacity building refers to the process by which individuals, groups, organisations and governments (local/central) develop their abilities, individually and collectively, to perform functions, solve problems and achieve objectives. In the context of SCP Education Plan Programme for Sri Lanka, capacity building is essentially required for teachers, teacher trainers, curriculum developers as well as the key implementing agencies. In addition, other personnel having a supportive role (such as administrative staff) may need awareness and training to enhance their capabilities to assist the implementers. The institutional capacity is also critical in establishing a conducive environment for the implementation as well as establishing effective monitoring and reviewing system for continuous improvements. Hence, identification of knowledge and capacity gaps and thereby inclusion of appropriate capacity-building and institution-strengthening activities should be considered as a must in the implementation of SCP Education Plan Programme for Sri Lanka.

5.4.2 The Approach

Generally, capacity building can occur at three-level process namely individual, organisational and the enabling environment [9]:

- Individual Capacity: This focuses on the competencies of the individual, such as the knowledge, skills and ability to set and achieve objectives. For example, capacity building for teachers focuses on enhancement of SCP subject knowledge as well as skill development on teaching methodologies/tools, evaluation, and related extra-curricular activities;
- Organisational Capacity: This refers to organizational structures, functions and systems that enable the capacities of individuals to come together to effectively fulfil the mandate of the organisation and to achieve set objectives. Within the formal education programmes, this is more important for the primary/secondary schools and high education institutes, as the principle of SCP has to be linked not only to all subjects, programmes and supplementary educational activities in accordance with the SCP curriculum but also to the institutional management for the integration of SCP on all levels. Further, organisational capacity is crucial in ensuring continuity and the preservation of institutional knowledge, given the high level of staff turnover within many agencies and ministries;
- Enabling Environment: This refers to the policy, legal, regulatory, economic and social support systems in which individuals and organisations operate. The enabling environment is determined by national policies, legislations, accountability, transparency and information flows. In particular, the capacity building within the strategic policy framework on SCP presented in Figure 5.1 should be a key activity in the overall capacity building programme. It is fundamental to have the capacity for providing the faculties/departments with the necessary professional development, resources, incentives, recognition, and support for developing and implementing SCP curricula.

It should be recognized that the above three levels of capacity are mutually interactive and each level influences the other. Therefore, the development of a comprehensive capacity development programme in line with typical Plan-Do-Check-Act (PDCA) cycle for continuous improvement with active engagement of stakeholders is recommended.

5.4.3 Priority Areas

The information collected through national, regional and international scenarios and the stakeholder consultations is used to identify the capacity building programmes as priorities for the successful implementation of SCP Education Plan Programme for Sri Lanka, as presented in Table 5.8.

Table 5.8: List of training programmes

Education Sector	Awareness and Training Programme
All Sectors	Training of Trainers (ToT) programmes
	Training programmes for curriculum developers
	Awareness of the top hierarchies of the line-ministries, related agencies and provincial councils/local governments, where applicable
Early Childhood	Training of pre-school teachers
	ToT programmes for field officers of Children Secretariat, public health officers, relevant officers in the provincial councils
	Educational and awareness programmes for parents
School Education (Primary and Secondary)	Teacher training (general and subject/discipline specific)
	Specific awareness programmes for school management staff
	General awareness programmes of the whole school community
Tertiary/University; Technical &Vocational	Training for sector specific teachers
	Specific awareness programmes for administrative/ management staff
	General awareness programmes of the whole university/college community
CPD	Subject/discipline specific ToT programmes
	Training of national administrative staff

5.5 Overall Results

The sectoral analysis presented in details above for the development of SCP Education Plan Programme for Sri Lanka could be summarized in comparative form in relation to the key attributes for easy reference. The findings are organized in a results-matrix and presented in Annex 2. The key attributes considered for comparative analysis of the six formal education sectors include the following:

- Age group (years)
- Type of education
- Relative simplicity in implementation in the current education system
- Possibility to introduce Inter-disciplinary and/or system thinking approach
- Incorporating with on-going Environmental education or awareness programs
- SCP education as part of resource efficiency program (Water and Energy)
- Types of educational materials needed
- Need for physical resources to introduce SCP concept in current education Institutions
- Need for human resources (teacher training needs)
- Regulatory aspects including monitoring (to introduce SCP in the current education system)
- Visibility of SCP education impact

- Major stakeholders
- Implementation priority.

5.6 Implementation Plan

The list of key tasks in a step-cyclic process of the overall development and implementation of SCP Education Plan Programme is presented in Figure 2.2 in Chapter 2, and details of each stage are presented therein. In particular, Section 2.3 deliberates in more details the implementation strategy of the SCP Education Plan Programme under the areas of Resource Enhancement & Mobilization; Sustain Momentum; Mainstreaming ESCP; Monitoring & Evaluation and Review & Update. In this section, a time-bound action plan for the implementation of the programme is presented under the following main areas:

- Establishment of administrative framework
- Adoption and launching of SCP Education Plan
- Development of curricula in the six levels/sectors of education
- Capacity building (individual and institutional)
- Introduction of common core modules on SCP
- Sustain momentum
- Monitoring & Evaluation
- Review & Update.

The detailed action plan is presented in Annex 3. The implementation of this action plan is essentially through the hierarchical model of the implementation and monitoring framework presented in Figure 5.1. As the activities related to the curriculum development and delivery are conducted separately for the six levels of formal education, the sectoral level implementation mechanism denoted in Figure 5.1, should have dedicated administrative body for each sector/level of education with relevant stakeholder representations as specified in Table 5.2. In particular, each sector-specific administrative body would comprise of an executing agency and implementing agency as lead institutes, assisted by other relevant stakeholder organizations. Table 5.9 presents the list of executing agency and implementing agency for each sector of formal education.

Table 5.9: Administrative arrangements for sector-specific implementation of activities

Education Sector	Lead Agencies	
	Executing Agency	**Implementing Agency**
Early Childhood	The Ministry of Women and Child Affairs	Children's Secretariat
School Education (Primary and Secondary)	Ministry of Education	National Institute of Education
Tertiary/University	Ministry of Higher Education	University Grant Commission
Technical & Vocational	Ministry of Skills Development and Vocational Training	Tertiary & Vocational Education Commission
CPD	Professional bodies and other organizations such as IESL,SLEMA, NCPC, SLIDA, SLSEA, NERDC, Universities	

As there is no provision in the present project for assistance to develop and implement SCP modules for other sectors, the Ministry of Environment should take initiatives to obtain support from the government and other related agencies to best implement the activities of the SCP education plan programme in Sri Lanka.

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6 Recommendations

The global challenges have a significant influence on the policies and development pathways articulated in the country. In the education sector too, there have been continuous efforts to improve the quality and relevance of educational programmes at different levels to suit the local requirements, while addressing global concerns. One such area of interventions is linked to the growing concerns over the sustainability of the prevailing development models, particularly arisen due to unsustainable consumption and production of natural resources. The need of enhancing values, knowledge, skills and attitude changes of the whole population that encourage responsible consumption, while ensuring sustainable production, to resolve these challenges is well recognised globally. Various educational interventions initiated in the above context could be recognised regionally and internationally. In Sri Lanka too, some gradual changes in the curricula and inclusion of SCP related topics could be noted at different levels of the formal education system, while noteworthy developments are experienced in CPD education. However, the underpinning principles of SCP, such as the interdisciplinary insight, system-thinking and life-cycle approach, which are required to achieve a transformative change in the society are still not adequately reflected. Further, though the sustainable production is articulated in some education programmes, particularly at University and CPD education systems, the sustainable consumption concepts are largely overlooked. Hence, development and implementation of SCP education plan programme for the whole education system are identified as an urgent need by all the stakeholders, not only for the progression of the education sector itself but also for effective attainment of socio-economic development of the country. Hence, endowing higher priority for the SCP education within sectoral reforms is highly recommended.

The overall process development and operationalization of the SCP education plan programme should adopt a comprehensive action plan covering interventions in different levels from strategic to operational, representing a step-wise circular model of continuous learning and improvement process. Accordingly, it is recommended to implement the proposed action plan for the period 2017 to 2022, which includes eight main activities namely Establishment of administrative framework, Development, adoption and launching of SCP education plan programme, Development of sectoral curricula and materials, Capacity building, Introduction /delivery of common core modules, Sustain momentum, Monitoring & Evaluation, and Review & Update. In particular, one of the essential intervention areas in this action plan is related to the governance, management and coordination. SCP is a multidisciplinary theme encompassing topics related to social, environmental, economic and technological areas, thus involving a diverse range of sectors, many stakeholders, different forms and levels of education, and ever-changing circumstances. As the present education sector setting may not be the best for managing such cross-sectoral and dynamical theme, appropriate changes have to be constituted. In particular, it is imperative that the SCP

education plan programme be implemented under a sound framework encompassing prospect for right governance, while facilitating effective coordination, collaboration and engagement of the key government institutions and other stakeholders, with a process of continuous improvements through lateral inputs from local and international experiences. This could be effectively realised by having two main levels of organisational decisions and processes: (i) hierarchical model of policy planning, policy implementation & monitoring framework at strategic level and (ii) implementation framework for sectoral programmes, projects and activities at functional and operational level. Establishment of a governance and management framework for the development and implementation of SCP education plan programme is a key recommendation of the present study. More specifically, the primary activity in the SCP education plan programme is the establishment of administrative framework includes setting up of, firstly SCP Policy Advisory and Monitoring Committee and secondly Sectoral Focal Point on SCP – Education during the 4th quarter of 2017, to oversee the timely implementation of all the other activities.

The most challenging task of the SCP education plan is the formulation of curricula catering for the learners at all levels best progression towards the knowledgeable, conscious, inclusive and empowered nation on SCP. As the development of SCP as a life skill is central to the overall education plan, the learning process should be a continual one from early childhood to adulthood, encompassing all the levels in formal, non-formal and informal forms of education. This demands for not only continuity of subject topics from one stage to another but also the development of competencies (referred to as core competencies - CCs) that describe the essential knowledge, skills, attitudes and values necessary for the practice of SCP in the professional, educational, and other life contexts. As these competencies should exceed the typical boundaries of a specific education programme, they are independent of the disciplines and subject topics and thus have interdisciplinary insight, centred on four pillars of learning - learning to know, learning to do, learning to be and learning to live together.

Thus, a well-structured and sound curriculum becomes the core of the SCP education plan, on one side having a content covering all the necessary ingredients of SCP, innovative and effective teaching/learning tools and evaluation methods for the development of CCs contributing to the programme outcomes (POs) and on the other side enough flexibility for introduction into the present curricula while adopting for the local contexts and changing situations. Accordingly, it is recommended that the framework of the curriculum of SCP education plan should base on the concept of a common core module for a given education sector category, amidst multiple, diversified perspectives from different academic disciplines, subject topics or age. In line with the present sectoral structure and progression of education in Sri Lanka, six distinct (but associated) categories, namely early childhood, primary, secondary, tertiary/university, technical/vocational, and CPD, should be considered for the formulation of a set of common core modules. Here, the non-formal and informal educations

are not considered as separate stages of SCP education, though they could contribute significantly to the effective learning of SCP. In the present approach, these two sectors are treated as integral parts of formal education sectors listed above, providing complementary and supplementary learning tools for enhancing the education processes and outputs therein.
Though the common core modules on SCP defer from one sector to another, the curriculum development and operationalization should essentially follow a common methodology for harmonisation and better interconnectivity. Basically, the process starts with establishment of relevant sector-specific competencies (SCs), learning outcomes (LOs) and list of subjects/topics, in line with CCs and POs of the overall SCP education plan, with clear understanding of how the particular sector contributes to SCP education plan programme and the connectivity of different subjects/topics. This is followed by preparation of detail syllabus, teaching/learning tools, teaching/learning materials and evaluation scheme. The other important aspect is the identification of the best method/s for the introduction of the common core module on SCP to the existing curriculum. Fundamentally, three different approaches could be utilized, namely (i) different topics in the common core module in SCP are taught in relevant subjects of the curriculum; (ii) the common core module on SCP is integrated into the curriculum as a specific subject; (iii) the common core module on SCP is taught as a cross-cutting interdisciplinary theme and incorporated into similar courses, projects and other activities across departments, faculties or universities. It is recommended that a combination of the above approaches be employed by considering the characteristics of a given education sector for the best progression of the SCP education plan programme. The resource requirements and capacity building needs have to be identified and addressed before the implementation of the proposed interventions.

In addition to the common reflections discussed above, particular consideration on sector-specific features should be given in the formulation of the common core module and its implementation in each education sector. Most critically, the thorough understanding of the governance and management structure, as well as curricula and subject offered, is required to recognise the best means and opportunities for the introduction of SCP education plan in general and the sector-specific common core module on SCP in particular. The operationalization of the SCP education plan programme should adopt a strategic approach for stage-wise implementation on priority basis, depending on the degree of efforts and level of importance/impact. Accordingly, the introduction of the SCP common core module would be most practical and prompt to both tertiary/university education and CPD education sectors due to the conducive environment in all aspects.

In the case of tertiary/university education, all the three methods of introduction are potentially viable. In almost all the UG and PG level course across all the disciplines and specialisations, relevant subjects could be identified to teach SCP topics within the syllabi. In some cases what required is to enhance the present topics covered to reflect the underpinning

principles of SCP. Further, the proposed 15 hr, 1 credit common core module for tertiary/university education could be easily integrated into any curriculum as a separate subject (either compulsory, elective or optional), with appropriate modifications to suit the discipline/specialisation. Further, as the majority of tertiary/university education institutes have more than one disciplines, harmonisation strategy where the common core module on SCP is introduced as an interdisciplinary theme across several departments and faculties highly recommended, as it facilitates the best demonstration of multidisciplinary nature of SCP. Under such perspective, the practicality of CCs, POs, SCs, LOs and list of subject topics identified for the SCP education plan could be tested and verified through the experiences in the tertiary/university education sector.

Similar to the tertiary/university education sector, CPD education sector is more amenable for the introduction of SCP education plan programme, with the emphasis to reaching wider professional groups for enriching the SCP concepts as professional practices. Here the more effective methodology of introduction would be the integration of the common core module to the curriculum as a separate subject, with appropriate alterations to cater for the target profession or offer the module as a standalone course in a form of workshop. For instance, introduction of the module to the CPD courses offered to Administrative Officers would benefit not only enhancing their learning on SCP, but also in implementing the SCP education plan programme itself. The other two methods of introduction are also applicable for this sector of education and it is recommended to explore the relevant opportunities.

The other sector of paramount importance for the development of SCP as a life skill is the early childhood education since education in that level is about laying a sound intellectual, psychological, emotional, social and physical foundation for development and lifelong learning. Although the development of the curriculum of a common module in this sector could follow the same methodology, the sector specific features are much different from the tertiary/university and CPD education sectors and thus needs different mechanisms of introduction. In particular, as there is a lack of formal structure in this sector, implementation of the plan needs a strategic approach with recognition on strengths of early childhood pedagogies and exploit them fully in the work with young children. Further, consideration of the role of the parents and family in promoting early childhood development, and create awareness and skills among parents become essential. This highlights the important role of non-formal and informal education means and tools, not only to deliver the relevant concepts of SCP to the learner cohort but also building awareness and skills of the community at larger who could assist the children's learning process. As there is a lack of progress of the SCP related education, and the policy and governance framework is not clearly structured, it is recommended to initiate the interventions at those levels too. Thus, presentation of the SCP educational plan to the Early Childhood Care & Development (ECCD) National Coordinating Committee for endorsement; inclusion of the concepts into the ECCD National Policy; and

awareness of the top hierarchies of the line Ministries (Ministries of Women and Child, Health Nutrition and Indigenous Medicine) and Provincial Councils become key recommendations. The other fundamental requirement for the effective progression of SCP education plan programme is the establishment of the human resource base, particularly through training programmes for Field Officers of Children Secretariat, Public Health Officers, and relevant officers in the Provincial Councils, as well as for pre-school teachers.

The learning at schools (both at primary and secondary level), following the early childhood education, is expected to have a major learning experience of SCP education plan with a significant level of competency development and transformative change in life-skills. As the curriculum development in schools is a long-term exercise, the introduction of SCP education plan is most challenging, but critical in this level. Yet, the strong education structure and the compulsion up to Grade 9 offer a perfect opening for the SCP education to the whole community. In this sector of education, incorporation of SCP topics into the existing subject modules and activities would be the more feasible option than intruding as a new module. Therefore, prior to the formulation of SCP curriculum, a comprehensive analysis of the present curricula, teaching/learning mechanisms, subject topics and evaluation methodologies to identify opportunities for introduction is recommended. Development of teacher training and effective utilisation of non-formal and informal education means (including present instruments such as Eco Club, Environment Pioneer Programme, School Energy Clubs, Green Schools) too would be required for the realisation of the targets.

Finally, the SCP education plan targeting the technical and vocational education has to be formulated and implemented for the development of technical skills, knowledge, values and attitudes necessary for the whole workforce in the country to drive the transition to a sustainable green economy. As there are three distinct skill levels of education within this sector, namely craftsmen, diploma and degree, the SCP education plan may require three different common core modules, which have to be developed through a comprehensive review of the present curricula and methods of delivery of the study programmes. In this effort, the most feasible sector is the one at degree level and the common core module on SCP developed for the tertiary/university education sector would be an effective starting point for the formulation of a similar one for the technical and vocational education sector.

The SCP education plan programme is a national level activity involving many sectors and stakeholders, thus demands interventions in many levels, mobilisation of resources and building of capacities. The commitment and active engagement of relevant institutions and stakeholders for overcoming these barriers and timely implementation of necessary interventions are vital for the success of the programme.

7 Annexes

Annex 1: Subject Topics under SCP Thematic Areas

- Theme 1: Diversity and inclusion (values, cultures and living conditions)
  - Human Behaviour and Lifestyle
  - External living environment and lifestyle
  - Culture, language, religion, values and norms in the context of sustainability
  - Cultural landscape
  - Ethical and spiritual values for sustainability
  - Sufficiency and modesty
  - Sustainable lifestyle
  - Cultural diversity and alternative lifestyles
  - Fashions, clothing styles and SCP
  - Information age, digital wisdom and internet lifestyle
  - Happiness and sustainability
  - History, indigenous knowledge, traditional lifestyles & sustainability
  - Consumerism, commodity culture and SCP
  - Societal transformation for SCP
  - International conventions related to heritage and cultural diversity (UNESCO).

- Theme 2: Demographic structures and socio-economic developments
  - History of socio-economic development and fossil fuel era
  - Cultural landscape
  - The concept of Sustainable Development
  - Demographic dynamics and sustainability
  - Human dimensions of natural resources
  - Socio-Economic models and practices
  - Cities, urban development and challenges
  - Role of SCP in population and development issues
  - Economic diversification and sustainable development.

- Theme 3: Politics, Policy, Advocacy and Governance
  - Sustainable development and global agenda (SDGs)
  - Global environment governance
  - Governance and SCP
  - Active citizenship
  - Stakeholder involvement
  - Social empowerment

- Theme 3: Politics, Policy, Advocacy and Governance (Continued)
  - Local policy and Institutional frameworks for development and environment
  - Local policy initiatives, commitments for climate change - NDCs
  - Local policy initiatives on SCP
  - Green funding, foreign aids and development finance
  - Global movements and networks on SCP
  - Multinational Environmental Initiatives
  - Environment movements and politics
  - International Treaties / Conventions / Declarations on sustainable development
  - International Law and Justice
  - National environment policy, regulatory and institutional frameworks.

- Theme 4: Globalization and sustainability
  - Historical developments of global economy, international trade and sustainability
  - Global interdependence
  - World citizenship
  - Globalization of economy
  - Globalisation and environmental degradation
  - Governance and SCP
  - Globalisation, inequality and poverty
  - Globalisation and knowledge economy
  - Sustainable globalization
  - Economic indicators / Human development index
  - Industrialisation, imperialism and colonialism
  - Globalisation and multinational corporations
  - International division of labour and sustainable development
  - Codification of international laws and international relations.

- Theme 5: Inequality, poverty, social security and rural development
  - Social security and sustainable development
  - Poverty eradication and SDGs
  - Economics of Poverty, Inequality and Wealth Accumulation
  - Poverty as cause and result of environmental degradation
  - SCP and rural industries
  - Rural development and social protection
  - Sustainable local and regional development
  - Safe drinking water and sanitation
  - Climate change adaptation and poverty reduction
  - Inequalities, demographic diversity and environmental degradation.

- Theme 6: Human rights, conflicts, corruptions and peace
  - Good governance and sustainable development
  - Transnational democracy
  - Ethnic minorities in multicultural societies
  - Human/ fundamental rights
  - Children's rights
  - Labour rights
  - Legitimacy
  - Social justice
  - Corruption, conflict and sustainable development
  - National policies, laws and regulations
  - International Treaties / Laws / Conventions / Declarations.

- Theme 7: Basics of SCP
  - Definitions and interpretations of SCP
  - Role of SCP in sustainable development
  - Life-cycle thinking perspective of SCP
  - Key elements and holistic approach in SCP
  - Good practices of SCP - Global, regional, national and local
  - Guiding principles of SCP
  - Global initiatives, networks, partnerships and resources on SCP
  - Rebound-effect and SCP.

- Theme 8: Energy and Sustainability
  - The concept and history of energy
  - Global energy balance
  - Development-Energy-Environment linkage and the fossil energy trap
  - Global energy supply and demand scenarios
  - Sustainable energy
  - Energy, Environment Economics & Policy Analysis
  - Energy storage
  - Renewable energy resources (local, global)
  - End-use energy applications/ services
  - Energy conservation and management
  - Energy conversion
  - Energy efficiency
  - Clean energy technologies / Low-carbon energy technologies
  - Modern energy services
  - Energy access; Energy poverty
  - Nuclear energy in a globalised world.

- Theme 9: Environment, Natural resources (air, water, minerals, metals, etc.) and their protection
  - The environment and the Bio-sphere
  - Biodiversity and Ecosystem services
  - Environmental cycles (Water, Carbon, Nitrogen, Nutrients)
  - The climate
  - Economic value of biodiversity and eco-system services
  - Planetary boundaries
  - Natural resources / indigenous resources
  - Impacts of extraction of natural resources
  - Minerals, Metals and Sustainability
  - Sustainable natural resource management
  - Indicators of natural resource use and impacts (footprints: carbon, water, ecological)
  - Ecosystem ecology
  - Sustainable environmental design
  - Industrial ecology
  - Circular economy
  - Precautionary principle and environmental laws
  - National laws and regulations with respect to natural resources
  - Environmental Planning
  - Resource conservation and management principles (water, raw materials)
  - Environmental risk assessment
  - Air quality management
  - Integrated water resource management
  - Waste water management.

- Theme 10: Industry, production, services and trade
  - Industrial revolutions and development
  - Development and environment
  - Production/Manufacturing and trade
  - Resource Efficiency and Cleaner Production
  - Sustainable production
  - SCP in Cities and Infrastructure
  - Life-cycle assessments (LCAs)
  - New/green materials
  - Sustainable design
  - Chemical Leasing
  - Sustainable procurement
  - Product life cycles and traceability
  - Environmental Management and Accounting

- Theme 10: Industry, production, services and trade (Continued)
  - Climate-smart processes, industries and services
  - Sustainable supply chain management
  - Corporate Environmental Management and Strategy
  - Sustainable marketing
  - Fair trade / ethical codes
  - Corporate social responsibility
  - Sustainable tourism and SCP
  - Financial services and instruments for greening.

- Theme 11: Science and technological progress
  - Science & Technology,
  - Society and Sustainability: Ambivalence of science and technological progress
  - Technology development (past, present and future trends)
  - Role of science & technology on sustainable development and SCP
  - Scientific knowledge base on global environment and related issues (IPCC Assessment Reports)
  - Technology advancements and cultural change /loss of culture
  - Modelling and assessment tools
  - Sustainability assessment of technologies (SAT)
  - Concept of environmentally sound technologies (ESTs) / Green technology
  - Clean energy / Renewable energy technologies
  - Energy efficient technologies
  - Environment pollution control technologies
  - Hydrogen – energy resource of the future
  - Advanced energy storage/mobile energy storage of the future
  - Carbon capture and storage
  - Sustainable built environments / green buildings
  - Ecological Urban Design
  - Green Engineering and Sustainable Design
  - Traditional/indigenous technologies and SCP
  - Innovation and Technology Transfer
  - Game-changing technologies in SCP
  - Green Chemistry
  - Modelling of Ecological and Environmental Data
  - Earth System Science
  - Science based-evidence of indigenous knowledge.

- Theme 12: Consumption and the environment
  - History of consumption
  - Present consumption patterns and future trends
  - Human behaviour and consumption
  - Consumer choice, commodities and product diversity
  - Sustainable consumption
  - Natural resource use and consumption patterns
  - Advertising and persuasion
  - Transformative social change for SCP.

- Theme 13: Consumer rights and responsibilities
  - Consumer protection policies
  - Laws, regulations and norms
  - Conflict resolution
  - Consumer rights to information
  - Consumer support mechanisms, services and agencies
  - Consumer responsibilities
  - Complaints, redress, replacement, reimbursement
  - Green washing and consumer rights
  - Traceability, transparency and accountability
  - Consumer information (green labelling/energy labelling and certification)
  - Peer pressure

- Theme 14: Education and communication
  - Education for All
  - Right to education / basic education
  - Education participation
  - Formal, non-formal and informal means of education
  - Indigenous and local SCP knowledge for Sustainable Development
  - Knowledge management cycle: Knowledge creation, sharing and application (Knowledge to Action)
  - Sustainability and the Information Society
  - Digital literacy; Media literacy; Media ethics
  - ICT and education
  - Education for sustainable development
  - Data-based information systems
  - Role of education in mainstreaming SCP
  - SCP as a life-skill
  - Chances and risks of mass communication.

- Theme 15: Research and innovation (Change management)
  - Creativity and innovation
  - Future perspectives of technological innovations
  - Social innovation for sustainability
  - Innovations for Systemic Change
  - Innovations and Entrepreneurship
  - Eco-Innovations and Eco-Designs
  - Principles of Urban Symbiosis
  - Sustainable Environmental Design
  - Circulatory Material and Resources
  - Technology Innovation
  - Digital lifestyle innovation
  - Internet of Things for digital lifestyle and smart communities

- Theme 16: Food and agriculture
  - Global / local food production
  - Food production in different agricultural systems
  - Food security: Sufficiency (agriculture, livestock, fisheries, & water resources sectors)
  - Sustainable production and processing of food: Efficient use of resources
  - Indigenous crop varieties and traditional agricultural practices for sustainable production
  - Sustainable plantation crops and agro-forestry
  - Post-harvest losses and food waste
  - Product branding, labelling & certification
  - Ecological, organic food
  - Mainstreaming climate and disaster resilience into food production systems
  - Food production in different agricultural systems
  - Food and hunger in the world: Under-/mal-nourishment and their consequences
  - Agriculture and rural/local development
  - Sustainable Food Production and Consumption
  - Fast' food production/ consumption
  - Genetic modification of organisms.

- Theme 17: Health and safety
  - Health and sustainability
  - National health care and social services
  - Healthy lifestyles
  - Traditional knowledge and indigenous methodologies in health care
  - Lifestyle illnesses

- Theme 17: Health and safety (Continued)
  - Economic development and its consequences for health/disease (medical progress vs. new health risks)
  - Food safety; Balance diet & Nutrition
  - The global spread of viruses and epidemics
  - Environmental pollution and Non-communicable diseases (NCDs)
  - Air pollution and health impacts
  - Indoor air pollution and health impacts
  - Product safety
  - Quality control, labelling and certification.

- Theme 18: Global environmental changes/ issues
  - Global environmental impacts of development
  - Climate change: GHG emissions and Global warming - The science
  - Climate Change: GHG emissions and Global warming - The trends
  - Climate Change: GHG emissions and Global warming - Impacts, Adaptation & Mitigation
  - Climate change and politics
  - UNFCCC and history of Climate Change Negotiations
  - Global climate actions; Carbon trading and new mechanisms (bilateral, multilateral, NAMA, NDCs)
  - National circumstances of GHG emissions and climate actions
  - Other global climate change issues: Ozone layer depletion, acid rain, global dimming.

- Theme 19: Mobility, urban development and traffic
  - The development of mobility – from bicycle to automobile and beyond
  - Historical change of mobility and traffic
  - Environment dimensions of transportation
  - Transport planning: Avoid-Shift-Improve principle
  - Megacities – new urban challenges
  - Transport sector and local air pollution; noise & light pollution
  - Transport sector and climate change
  - Transport sector and land use change
  - Environmentally sustainable transportation (EST)
  - Sustainable transport infrastructures
  - Mass transport / public transport
  - Non-motorized transportation (NMT)
  - Transport demand management (TDM)
  - Transport safety.

- Theme 19: Mobility, urban development and traffic (Continued)
  - Sustainable urbanisation, green cities and sustainable mobility
  - ICT for transport demand management & Intelligent Transport Systems
  - Cleaner fuels and vehicles
  - Transport and SCP linkage
  - Intermodal Transport systems
  - Sustainable freight transport
  - Aviation, ports and environment
  - Ships, ports and environment
  - Inland water transport and environment.

- Theme 20: Waste and hazardous materials
  - Development, lifestyle and waste generation
  - Waste management principles / waste management hierarchy / 3R
  - Life Cycle Thinking and waste management
  - Best practices for waste management
  - Environmental friendly packaging
  - Zero-waste materials, processes and technologies
  - Waste agricultural biomass generation and management
  - Municipal solid waste generation and management
  - Medical / clinical wastes generation and management
  - Hazardous waste generation and management
  - e-Waste generation and management
  - Extended responsibility for products
  - Role of society on waste management / Extended consumer responsibility
  - Polluter-pay principle
  - International Treaties and Initiatives: Chemicals and Waste
  - National waste management policies, laws, regulatory and institutional framework.