



United Nations
Educational, Scientific and
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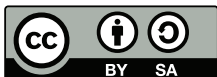
NOT JUST HOT AIR

Putting Climate Change Education into Practice



Published in 2015 by the United Nations Educational, Scientific and Cultural Organization,
7, place de Fontenoy, 75352 Paris 07 SP, France

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ISBN 978-92-3-100101-7

Published in 2015 by the United Nations Educational, Scientific and Cultural Organization.

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Printed in France

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**Putting Climate Change
Education into Practice**

PREFACE

Climate change presents a global challenge of a magnitude that human beings have not encountered before. Climate change has far-reaching repercussions for where people can settle, grow food, maintain infrastructure and rely on functioning ecosystems. It poses a number of interconnected challenges that go well beyond environmental boundaries and include threats to water security, rising pressures on food production, increased risks of natural disasters as well as public health challenges.

The 1992 United Nations Framework Convention on Climate Change (UNFCCC) and subsequent international agreements have recognised that education is an essential element for mounting an adequate global response to climate change. Education is critical in helping populations understand and address the impacts of climate change, and in encouraging the changes in attitudes and behaviour needed to help them address the causes of climate change, adopt more sustainable lifestyles and develop skills that support different modules of economies, as well as to adapt to the impact of climate change. In particular, education can enhance the resilience of vulnerable groups and communities, especially in developing countries, who will be disproportionately affected by these changing conditions.

Climate change is increasingly recognised as an emerging crisis requiring radical and immediate action. The changes needed range from the local to the global: from the daily activities of individuals, to economic and social development and new forms of global governance. While progress towards putting global frameworks into place has been slow, there is increased political commitment to confront climate change at the national level and make use of education to address climate change.

UNESCO will continue to support countries in strengthening their capacities to address climate change. Climate Change Education will remain an important action area within the Global Action Programme on ESD, the follow-up programme to the UN Decade of ESD. UNESCO and its partners will advocate for reinforced country commitments to strengthen awareness raising and education on climate change under Article 6 of the United Nations Framework Convention on Climate Change (UNFCCC). This publication showcases the recent pilot experience of five countries that have initiated national Climate Change Education for Sustainable Development programmes, and offers a brief policy review of sixteen others, along with some recommendations for policy makers drawn from the pilot experiences and country reviews, as well as additional research.

ACKNOWLEDGEMENTS

UNESCO would like to express its profound thanks to the authors of the five CCESD country case studies: Bilda Valentin, Daniel Abreu and Omar Ramirez (Dominican Republic), Paulette Bynoe, Therese Ferguson and Denise Simmons (Guyana); Sushita Gokool-Ramdoo (Mauritius); Heila Lotz-Sisitka and Caleb Mandikonza (South Africa); and Damien Sweeney and Martin Pritchard (Tuvalu).

The development of policy recommendations included in this publication was informed by a review of literature and a cross-national desk study of national policy reviews on ESD and Climate Change Education (CCE). UNESCO would like to thank those who contributed conceptually to the drafting of the policy recommendations as well as the authors of country policy reviews on CCE and ESD: Jeppe Læssøe (cross-national analysis and UK/England, Denmark, South Africa), Audrey Bryan (guidelines drafting), Supriya Singh (India), Rachel Trajber (Brazil), Junghee Sung (Korea), Qingqing Han (China), Luis Rodrigo Arrué (Chile), Simon Rolls (Australia, Canada/Manitoba), Adriana Valenzuela (Dominican Republic).

UNESCO would also like to acknowledge the generous in-kind contribution by a group of researchers on Disaster Risk Reduction at Kyoto University, Japan, which allowed us to add five more countries to the cross-national study: Rajib Shaw (overall supervision),

Glenn Fernandez (Philippines), U. Habiba and M. Abedin (Bangladesh), Tsuneki Hori (Costa Rica), Farah Mulyasari (Indonesia), and Thi My Thi Tong (Viet Nam).

UNESCO would also like to express its gratitude to the participants of the Expert Consultation on Guidelines on Climate Change Education in the context of Education for Sustainable Development, held in Paris in April 2013.

Furthermore, UNESCO wishes to express its thanks to Leila Loupis and Alison Clayson who developed and edited the final version of the publication.

Our appreciation also goes to the coordinators of the Climate Change Education for Sustainable Development country programmes: Daniel Abreu, Samuel Fernandez Dieckert, Barbara Foster, Julia Heiss, Min Jong Kim, Vivian Malema, Yoko Mochizuki, Christian Morabito, Robert Parua, Jutaro Sakamoto, Olato J. Sam, Julia Viehofer, Sue Vize.

UNESCO gratefully acknowledges the funding provided by the Government of Japan for its work on Climate Change Education within the programme on Education for Sustainable Development.

EXECUTIVE SUMMARY

Climate change poses an unprecedented challenge to the global community. Its repercussions affect all aspects of sustainable development, including human health and well-being, food security, economic growth, natural resources and biodiversity. Facing this challenge will require behavioural changes to adapt and respond to immediate crises while also learning to adopt more sustainable practices to reduce greenhouse gas emissions for the longer term.

The global community has recognised that education plays a key role in responding to climate change. Education can help policy-makers understand the urgency and importance of putting mechanisms into place to combat climate change on a national and global scale. Communities can learn about how climate change will affect them, what they can do to protect themselves from negative consequences, and how they can reduce their own climate footprint. In particular, education can help increase the resilience of already vulnerable communities who are the most likely to be adversely affected by climate change.

UNESCO's work on Climate Change Education (CCE) aims to make education a more central part of the international response to climate change. UNESCO is working with national governments to integrate Climate Change Education into national curricula and to develop innovative teaching and learning approaches for doing so.

The UNESCO Climate Change Education for Sustainable Development programme also aims to help people understand climate change by expanding CCE activities in non-formal education through the media, networking and partnerships. It is grounded in the holistic approach of Education for Sustainable Development (ESD) which incorporates key sustainable development issues such as climate change, disaster risk reduction and others into education, in a way that addresses the interdependence of environmental sustainability, economic viability and social justice. It promotes participatory teaching and learning methods that motivate and empower learners to change their behaviour and take action for sustainable development.

Based on country experiences and a review of policy documents, UNESCO has developed the following five **recommendations for policy-makers** on how CCE and ESD can be integrated at the national level:

- 1. Policy development:** ESD is an interdisciplinary, cross-sectoral approach, which aims to prepare people for change by equipping them with a broad base of knowledge, skills, dispositions and values. Governments need to integrate ESD and CCE into all levels and types of education and across the curriculum.
- 2. Governance and resources.** Integrating CCE and ESD into national systems requires high-level support from the government, with cross-sectoral coordination and harmonization. CCE and ESD programmes were found to be more successful when a national coordination structure was clearly defined.
- 3. Curriculum development:** Ministries of Education and education planners should review, develop and strengthen their curricula to ensure that CCE and ESD feature at all levels of the education system. This will entail creating new work units for teachers, and developing new pedagogical approaches with greater emphasis on critical thinking and problem-solving skills. New curricula should be flexible enough to be adaptable to local contexts.
- 4. Capacity-building of teachers and education planners.** Teachers and non-teaching staff need to understand climate change, and have sufficient, locally-adapted materials for classroom use.
- 5. Public awareness, communication and stakeholder involvement.** Governments should support non-formal education opportunities provided by communities, civil society and the media, all of which play an important role in conveying information about climate change mitigation and adaptation.

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INTRODUCTION

Climate change is one of the greatest threats to sustainable development. The ten hottest years on record have occurred since 1998. Sea levels are rising; ever more frequent natural disasters, such as cyclones and tropical storms, are threatening people's homes and livelihoods. In its latest report, the Intergovernmental Panel on Climate Change (IPCC) stressed that 'a changing climate creates pervasive risks but opportunities exist for effective responses'.

Climate Change Education is a powerful tool for developing such responses and helping people address climate change. It helps learners understand the causes and consequences of climate change. It prepares them to live with the impacts of climate change and empowers learners to take appropriate actions to adopt more sustainable lifestyles.

Within its programme on **Education for Sustainable Development**, UNESCO offers support to countries to enable their policy makers and teacher educators to act on climate change.

This publication *Not just hot air: Putting Climate Change Education Into Practice*, presents UNESCO's work on Climate Change Education for Sustainable Development in 2012/2013, and intends to serve as a reference for similar work in the future.

It provides:

National case studies on five CCESD country pilots conducted by UNESCO in 2012/2013 in: Dominican Republic, Guyana, Mauritius, South Africa and Tuvalu. The case studies include an analysis and assessment of the undertaken CCESD capacity-building work for policy makers and teacher educators, lessons learnt about the implementation of the programme, and conclusions.

16 short country profiles from around the world on policy development regarding ESD and Climate Change Education.

Recommendations on Climate Change Education in the context of Education for Sustainable Development, developed by UNESCO in order to establish a common understanding of what needs to be done to enhance education responses to climate change.

This publication is intended to provide policy makers and teacher educators with a compact source of information on how to mobilize education to address climate change.

CLIMATE CHANGE EDUCATION IN PRACTICE:

Case studies of national experiences

Introduction
Dominican Republic
Guyana
Mauritius
South Africa
Tuvalu

Introduction to UNESCO's work on Climate Change Education for Sustainable Development

UNESCO's work on Climate Change Education (CCE) within the framework of Education for Sustainable Development (ESD) aims to make education a more central and visible part of the international response to climate change. Established in 2010, the programme seeks to help people understand the impact of global warming today and increase 'climate literacy', especially among young people.

The Climate Change Education for Sustainable Development (CCESD) country programme, developed in 2012 and 2013, offered support to Member States, particularly in Africa and Small Island Developing States (SIDS), to strengthen their educational responses to mitigating and adapting to climate change. The objectives of the programme were to:

- strengthen the capacity of countries to provide quality Climate Change Education;
- encourage innovative teaching approaches to integrate Climate Change Education in schools; and
- raise awareness about climate change as well as enhancing non-formal education programmes through media, networking and partnerships.

CCESD can contribute to the development of a comprehensive and coordinated approach to averting climate chaos. Moreover, mainstreaming CCESD has the potential to strengthen the entire education system by enhancing the legislative, planning governance, pedagogical and infrastructural dimensions of the system¹

Box 1. What are climate change mitigation and adaptation?

Climate change **mitigation** refers to human actions aiming to stabilize or reduce greenhouse gas concentrations. These include conserving energy, investing in renewable energies and promoting changes in lifestyle and consumption.

Climate change **adaptation** refers to human actions to build resilience and reduce vulnerability to existing impacts of climate changes. This is closely aligned with the concept of disaster risk reduction.

Scope of UNESCO's national Climate Change Education for Sustainable Development (CCESD) programme

UNESCO's CCESD national programmes worked with local authorities to build capacity in education policy and planning, curriculum development, teacher training, reforming and greening technical, vocational education and training (TVET) programmes and in developing education plans and programmes for disaster preparedness.

The CCESD programme targeted three priority groups.

- 1. Policy makers.** CCESD provides a strategy for integrating mitigation and adaptation to climate change into national climate action plans and policies as well as into education policies. This requires developing the capacity of national decision-makers and personnel of relevant institutions to draft and review these policies.
- 2. Teachers and teacher educators.** Before education can foster change, it is first necessary for teachers to understand what such change implies, to recognize the need for it, and to have the competence and confidence to introduce new methods, approaches and attitudes into classroom learning. They will need an accurate understanding of climate change and of how it relates to broader issues of sustainable development.
- 3. Curriculum development specialists.** Guidance and training should enable education planners and curriculum development specialists to understand the multi-disciplinary nature of climate change, to analyze its relevance to particular national and local contexts and to integrate Climate Change Education across curricula.

1. UNICEF, 2012.

Country selection

UNESCO's CCESD programme focused on supporting those countries that are facing increased disaster risks, especially SIDS and non-island countries with large coastal areas, and countries in Africa. With UNESCO's support, these countries would develop national programmes and recommendations which could be replicated in other countries within the Caribbean, Asia-Pacific and Indian Ocean regions, and Africa. Four pilot countries were initially to take part, later expanded to the five that are presented in this document: Dominican Republic, Guyana, Mauritius, South Africa and Tuvalu.

Implementation

In cooperation with national partners, including the Ministries of Education, national training institutions, NGOs and UN agencies, UNESCO contracted national teams in each pilot country to coordinate and implement the CCESD programme. Their tasks included:

- conducting a country review and developing a needs analysis through a survey of national initiatives relevant to CCESD and national policies and curricula, and a consultation with stakeholders;
- adapting the generic materials such as the in-service teacher training course and curriculum modules on CCESD to the local context of each pilot country;
- organizing workshop(s) to adapt and translate the UNESCO CCESD materials and tools;
- providing country-level support to build capacities of policy-makers and national change agents on CCESD;
- conducting monitoring and evaluation to assess the outcomes of the CCESD capacity-building activities.

The activities were intended to sensitize and strengthen the knowledge and capacities of national education planners and practitioners (including policy-makers, teachers and teacher educators and curriculum development specialists) in mainstreaming CCESD in national policies and curricula. An additional objective was to assist trainers and teacher education institutions to integrate CCESD into their training programmes and develop and disseminate quality, locally-adapted curricular materials.

The results of this work, including an assessment of UNESCO's efforts to build capacity on CCESD, lessons learned and conclusions were documented in national case studies. A summary of these case studies is presented in the following sections.

Dominican Republic

HIGHLIGHTS

- Four hundred teachers were trained, reaching more than 20,000 pupils in just one year.
- A holistic approach was used to adapt the education for sustainable development methodology.
- The government was committed to the programme and provided financial support.

1. Introduction

The Dominican Republic is the second largest Caribbean nation, with an estimated population of just over ten million, one million of whom live in the capital city of Santo Domingo.

The Dominican Republic is highly vulnerable to the impact of climate change, particularly the increasing frequency and intensity of storms, rising sea levels and coastal erosion, biodiversity loss, and health impacts due to dengue fever and malaria. Globally, it is ranked the tenth most vulnerable country to extreme weather events.²

2. Education system

The formal education system in the Dominican Republic is comprised of preschool, primary, middle (intermediate), secondary, vocational and tertiary education. Primary, middle and secondary school education is free and compulsory for children aged between 3 and 17. A high school diploma is awarded at the end of the secondary education level. However, relatively few lower-income students succeed in reaching this level due to financial constraints and limited access to schools. Wealthier students attend private schools, which are often funded by religious institutions. Public and private vocational schools are available, particularly in the field of agriculture. The Ministry of Education is responsible for education policies.

The Dominican Republic faces many educational challenges, and student performance in mathematical competencies, reading and natural sciences are among the lowest in Latin America and the Caribbean.³

In 2012, the country doubled its investment in education for the period of 2012-2016, by allocating close to four per cent of GDP to education.

3. The national Climate Change Education for Sustainable Development programme

3.1 Approach

The Dominican Republic became a pilot country for UNESCO's Climate Change Education for Sustainable Development (CCESD) programme through its involvement in the One UN Training Service Platform on Climate Change (UN CC:Learn) (See Box 2). Both the UN CC:Learn programme and the UNESCO CCESD pilot programme were implemented by the Dominican Republic's National Council on Climate Change and Clean Development Mechanism (CNCCMDL).

Box 2. UN CC: Learn

The UN CC:Learn Programme in the Dominican Republic was initiated at the end of 2011 with a 24 month implementation period. The overall goal of the national strategy under UN CC:Learn is to create a national framework for coordinated and enhanced action to strengthen learning relevant for green, low emission and climate resilient development. While the UN CC:Learn aims at developing a large national learning strategy for several sectors, UNESCO CCESD national programmes focus on the education sector and consider the extent to which CCE and ESD principles are included across all government policies, strategies and action plans.

The *National Strategy to Strengthen Human Resources and Skills to Advance Green, Low Emissions and Climate Resilient Development* was launched by the Vice President of the Dominican Republic in August 2012, demonstrating the high level of government commitment to the programme. The *National Strategy* included a conceptual framework to guide the design of learning actions and quality education processes based on the constructivist approach (See Box 3).

2. Harmeling and Eckstein, 2013.

3. UNESCO, 2008.

Box 3. What is the constructivist approach?

Constructivist teaching and learning is based on the belief that learning occurs as learners are actively involved in a process of meaning and knowledge construction, as opposed to passively receiving information. Learning always builds upon knowledge that a student already has, and learners are the makers of meaning and knowledge. Constructivist teaching fosters critical thinking, and creates motivated and independent learners.⁴

As part of the UN CC:Learn methodology, up to three priority actions had to be defined for immediate implementation. A wide consultation process was carried out and all participating institutions reached a consensus. The top priorities identified were teacher training and the introduction of climate change at all levels of the education curricula.

3.2 Current status of CCE and ESD

Environmental education was made mandatory for all schools in the Dominican Republic in 1998. The 2000 General Law of Environment and Natural Resources promoted environmental education as a cross-cutting theme. Despite this, climate change and education for sustainable development (ESD) were mostly absent from the curriculum.

The initial phases of the UN CC:Learn needs assessment did not fully evaluate the extent to which CCE and ESD were embedded in other non-educationally focused government policies, strategies and action plans. However, a number of specific legal and institutional instruments to address climate change, and which refer to education and capacity-building, were identified. These include: the National Council for Climate Change and Clean Development Mechanism (CNCCMDL); the *National Adaptation Action Plan (PANA)*; the *Strategic Climate Change Plan (2011–2030)*; and the *Plan for Economic Development that is Compatible with Climate Change*.

3.3 Capacity-building activities

The *National Climate Change Learning Strategy* was carried out through a National Implementation Platform. This platform facilitates the mobilisation of resources, coordinates the implementation of priority actions, and fosters regular dissemination of information and learning materials among key partners. As part of this,

the UN CC:Learn and UNESCO CCESD programmes delivered a number of capacity-building activities as specified in *this Strategy*.

Curriculum revision

The Ministry of Education had planned to conduct a routine full review of all levels of the education curriculum between August 2012 and July 2013. As this coincided with the UN CC:Learn/ UNESCO programme, Climate Change Education was included in this review process.

Translation of UNESCO CCESD resources

The CNCCMDL translated and adapted UNESCO's *Climate Change in the Classroom: UNESCO Course for Secondary Teachers on Climate Change Education for Sustainable Development* into Spanish.⁵ One thousand copies of the Spanish version were printed and disseminated among the teachers who had completed the capacity-building training.

National CCESD Training Programme for Teachers

The CNCCMDL and the Ministry of Education's National Teacher Training Institute (INAFOCAM) developed a training programme on climate change for teachers, based on CCESD methodology and the translated *Climate Change in the Classroom: UNESCO Course for Secondary Teachers on Climate Change Education for Sustainable Development*. The national training programme was launched by the Vice President at the National Palace, again demonstrating the strong government support for the UN CC:Learn programme.

The training programme consisted of a national pilot workshop for 45 trainers and facilitators. These trained trainers then reached 400 teachers in 18 regions of the Dominican Republic. Trained teachers from the initial pilot monitored the implementation of CCESD in selected teacher training institutions, providing support and supervision and collecting data. The training programme also included an international exchange component for teachers.

International experiences and exposure

The UN CC:Learn/ UNESCO programme provided opportunities for representatives from the Dominican

4 Escaño and Gil de la Serna, 2008.

5. The CCESD course was originally designed by UNESCO to support teachers in helping young people understand the causes and consequences of climate change, and bring about changes in attitudes and behaviours. See <http://www.unesco.org/new/ccesd>

Republic to gain exposure to the politics of climate change at the international level. Two teacher educators and two technical staff from INAFOCAM presented the *Climate Change in the Classroom* programme during the United Nations Framework Convention on Climate Change Conference of the Parties (COP-19) in Poland. The same presentation was also made at other international events.

The UN CC:Learn programme also conducted Climate Change Education training for journalists and climate change finance training for national stakeholders.

3.4 Outcomes

3.4.1 Achievements

The UN CC:Learn and UNESCO CCESD programmes provided the impetus to integrate climate change and ESD into the Dominican curriculum, and to build teachers' capacity to deliver ESD in schools. The UNESCO CCESD programme added value to the existing UN CC:Learn programme, and demonstrated the synergies that can be achieved when programmes that have similar aims are implemented in a coordinated approach. Other achievements include:

Building climate change awareness

The programmes specifically laid the foundations to ensure that students attending school will be more aware about climate change issues and be more engaged in their learning about climate change, supported by teachers and materials that incorporate ESD principles.

Addressing the learning needs of teachers

Two hundred teachers who had participated in the training (from the second cycle of primary school and secondary) were asked to evaluate the programme. Nearly all stated that the training objectives were relevant and addressed their learning needs, and that they had gained relevant, new knowledge about climate change adaptation and mitigation, as well as new teaching skills. The supporting resources, guides and materials were found to be particularly useful and easy to understand. Participants reported that the field visit was an inspiring and intense learning exercise.

Advocacy in the community

Outside of the education sector, the programmes have also increased the capacity of journalists to report on climate change issues, which will help raise awareness and understanding of climate change in the wider community.

In addition to these achievements, there has been increased awareness of climate change finance modalities within the government sector. The programmes have also helped publicize the actions of the Dominican Republic in an international arena.

3.4.2 Challenges

A review of the UN CC:Learn and UNESCO CCESD programmes in the Dominican Republic did not reveal many major shortfalls in their design or implementation. There were, however, some other issues worth noting.

Sector-wide curriculum revision

Originally, the Ministry of Education had planned to revise the entire curriculum at all school levels. However, due to time constraints, only the curricula for pre-school and the first cycle of primary levels were revised to include Climate Change Education. The Government has committed to revise the remainder of the education curriculum (second cycle of primary and secondary levels) in 2014 to include CCE and ESD.

Adopting new methodologies

Follow-up support and monitoring of teachers in the classroom has not yet occurred and, thus, it is difficult to determine the impact that the teacher training has made in the classroom. It was supposed that some long-serving, experienced teachers would resist adopting new CCESD methodologies in their teaching and learning practice. Further long-term monitoring will be necessary to evaluate whether this is so.

Developing a holistic approach

The UNESCO CCESD programme was initiated late into the delivery of the UN CC:Learn programme in the Dominican Republic. Thus, the more detailed UNESCO CCESD programme needs-analysis was not conducted, and there was no opportunity to review the status of CCESD across all existing government policies and programmes. This may result in a more fragmented approach to CCESD, as UN CC:Learn focuses more on climate change in the education sector, rather than across all government policies and ministries. Moreover, while the implementation phase of the UNESCO CCESD programme would usually include capacity-building for policy makers to integrate CCE and ESD into government policy, this was not carried out in the Dominican Republic for timing reasons.

3.4.3 Sustainability

Several positive findings indicate that the progress already made by the UN CC:Learn and CCESD programmes will continue. INAFOCAM and CNCCMDL have made a commitment to expand the teacher training component of the UN CC:Learn programme to reach an additional 600 teachers in 2014. This comes in parallel with the current government's commitment to double public education expenditure, with a particular focus on teacher training.

Initial discussions between the Dominican Republic, UNESCO and Cuba indicate that an opportunity may exist to expand the UN CC:Learn programme into Cuba. The Dominican Republic may be able to use its own knowledge, skills and experience to support part of this process. The programme may also be able to benefit from the UNESCO CCESD training resources that have been translated into Spanish.

4. Conclusions

The UN CC:Learn and UNESCO CCESD programmes can be considered an overall success. They effectively implemented well-conceived activities and achieved a number of objectives to develop CCESD in the Dominican Republic. The programmes also coincided with a review of the national curriculum, which allowed the government to include climate change and ESD in this process. However, additional time will be needed to determine what impact the teacher-training programme will have on teacher performance in the classroom.

While using a bottom-up approach to identify key actions and priorities, the programme enjoyed a high level of political support from the national government. As a result, it was able to build strong relationships with key stakeholders such as the Institute of Teachers Training (INAFOCAM) and the Curriculum Department of the Ministry of Education.

The government committed to continue integrating climate change and ESD into the curriculum and building the capacity of teachers on CCESD, plus to increase the national expenditure on Climate Change Education with an additional USD 1 million. The funds will cover 85 training courses for 3,000 teachers all over the country, three train-the-trainer workshops, as well as the participation of 25 teachers in international and regional cooperation to engage with other countries on the topic of Climate Change Education.

Guyana

HIGHLIGHTS

- The programme successfully implemented a national survey and capacity-building workshop on CCESD.
- The National CCESD *Follow-Up Plan and national Strategy* to integrate CCESD in school curricula was developed and is currently being implemented.
- Future development will require greater policy leadership, coordination and teacher training.

1. Introduction

The Republic of Guyana is the third smallest independent state in mainland South America. It has a population of approximately 769,600 representing diverse ethnic groups including East Indians, Africans, Amerindians, Chinese and Portuguese.⁶

Ninety per cent of Guyana's population is concentrated in its coastal plain region, which is home to the capital, Georgetown. This low-lying city is prone to flooding and is at risk from rising sea levels. Guyana has many low-lying regions along the coast and is extremely vulnerable to the physical, social, economic, and ecological risks resulting from climate change.⁷

2. Education system

Guyana's formal education system is comprised of pre-school/nursery, primary, secondary, post-secondary (comprised of technical and vocational education and teacher training) and tertiary level. The formal education system is funded by the central government. There are a few self-funded private schools that provide education from nursery to secondary school level.

The Ministry of Education's *Strategic Plan 2008-2013: Meeting the Quality Imperative* identifies key issues and challenges in the education sector. These range from the struggle to deliver quality education and the difficulty of achieving universal secondary education to the shortage of trained teachers.⁸ Combined, these challenges present a barrier to developing Climate Change Education for Sustainable Development (CCESD) in Guyana.

6. Government of Guyana, 2012.

7. Government of Guyana, 2002.

8. Guyana: Ministry of Education, 2008.

3. The national Climate Change Education for Sustainable Development programme

3.1 Approach

UNESCO commissioned the University of the West Indies (UWI) Consulting to implement the UNESCO CCESD country programme in Guyana between 2012 and early 2013.

UWI Consulting carried out a national survey to provide an extensive body of data on the state of Climate Change Education in Guyana, which was used to guide the preparations of the national capacity-building programme. The survey consisted of a desk review of the existing national policies, strategies, action plans and initiatives that include elements of CCE and ESD. It also assessed the level of awareness of climate change and disaster risk reduction (DRR) among teachers and educators from the formal and non-formal education sectors. Teacher training in climate change and DRR was also reviewed, as was the awareness of the existence of current programmes, plans, policies and strategies for educating students in these areas. The survey examined social science and science subjects and documented those that included Climate Change Education. The survey also compiled CCE and ESD-related educational resources.

A Team of National Partners was formed to lead the design and implementation of the CCESD programme workshops, follow-up plan and strategy.

3.2 Current status of CCESD

The national survey carried out by UWI Consulting provided a broad overview concerning Climate Change Education in Guyana. While Guyana lacks a national policy framework for CCESD, education is mentioned in some other government policies such as the 2001 *National Climate Change Action Plan* and the 2009 *Low Carbon Development Strategy*. A range of different stakeholders have a role in CCESD, including the Ministry of Education, the National Centre of Educational Resource Development, the Environmental Protection Agency (EPA), teacher training institutes, international governmental and non-governmental organizations, teachers, students and parents.

The formal education sector contains several subjects covering CCESD, and since 2011, projects have been implemented to include CCE in nursery, primary and secondary school curricula. While many teachers have integrated climate change and disaster risk reduction into their teaching, few had received formal training in these areas or were aware of the existence of any when surveyed. The EPA works with teacher training institutes to include environmental education in teacher training curricula. The University of Guyana also offers undergraduate and post-graduate courses on environmental issues.

There is evidence of CCESD in Guyana's non-formal education sector, including international days, lecture series, youth camps and community awareness workshops in remote areas. The *Public Education Programme and Implementation Strategy* (2012) will continue to guide education about climate change mitigation and adaptation in Guyana.

3.3 Capacity-building activities

Capacity-building workshop

A three-day capacity-building workshop on CCE and disaster risk reduction (DRR) was organized in Georgetown in March 2013. Seventy-nine participants attended the workshop, including policy-makers, education administrators and representatives of teacher education institutions, other tertiary institutions and schools. The workshop introduced participants to locally designed and developed CCE materials (lesson plans and activity guides), and participants were provided with facilitators to guide their interpretation and use of the materials in planning and delivering lessons. The training workshop helped teachers gain skills in interpreting the prepared materials, adapting lesson plans for different levels using the material provided, and engaging in discussions on climate change.

National CCESD Follow-Up Plan

Recommendations from the capacity-building workshop and the Team of National Partners resulted in the drafting of a *Final CCESD Follow-up Plan and Strategy – Guyana*. The detailed plan included the rationale, resources required and responsibilities for actions to be carried out over the short, medium and long term. Short-term actions identified were:

- development of a national policy for ESD and CCESD;

- formation of a core group to network and develop an Action Plan;
- identification of teachers for use in a 'train the trainers' approach;
- increased collaboration between education and environment agencies and entities;
- mobilisation of resources for capacity-building, research, documentation, and programme implementation;
- creation of mechanisms for information sharing and dissemination amongst national-level stakeholders and those at a wider level;
- implementation of a more detailed CCESD review, building on the baseline study/gap analysis undertaken by the UWI Consulting Group. The review should include a focus on the extent to which CCESD and DRR can be inserted into the curriculum without creating an overload or imbalance.
- review and revision of the TVET curriculum.

In the medium-term, the *Plan* identified the need to continue implementing capacity-building initiatives, develop pilot projects and carry out research inclusive of indigenous knowledge. In the long-term, the *Plan* proposes the integration of CCESD and DRR in all sectors, as well as monitoring and evaluation, research and publications, the development of new projects and the mobilization of resources for these projects.

3.4 Outcomes

3.4.1 Achievements

Building CCESD knowledge, skills and awareness

The UNESCO CCESD and DRR capacity-building workshop strengthened the knowledge, skills, attitudes and values of nearly 80 education planners and practitioners. A review of the workshop concluded that it had met its intended objectives, specifically:

- disseminating preliminary findings of the Review and Survey;
- deepening knowledge and understanding of climate change and sustainable development at the global, regional and national level. Eighty five per cent of the post-workshop survey respondents increased in their knowledge in this area;
- introducing UNESCO CCESD materials and resources, including methodologies for integrating CCESD into the national curriculum;

- creating action plans for CCESD and DRR programmes.

Creating momentum among stakeholders

The *Final CCESD Follow-up Plan and Strategy – Guyana* has provided information to inform policy development and actions in respect of CCE at various levels of decision-making in the education sector. An increased understanding of CCE and a momentum for further actions have been generated among stakeholders.

3.4.2 Challenges

Survey coverage and limitations

While the survey produced a good snapshot of CCESD in Guyana, limitations included a lack of time, long travel distances, transportation costs and rugged terrain that reduced the survey's ability to cover a representative sample of Guyana's educational institutions. This lack of representativity brings into question how valid the survey's findings are for the entire education system.

Insufficient policy directives

CCESD has been embedded in some national policies, strategies and plans. However, policy-makers at the national level need increased knowledge of climate change and DRR and strengthened capacity to create and implement policies that support CCESD. There is no explicit policy to direct ESD and CCESD initiatives in Guyana. However, the existing *National Environmental Action Plan* includes environmental education and provides an opportunity to be expanded to incorporate CCESD.

Inadequate teacher training on CCESD

Many teachers find understanding the science of climate change difficult, and this inhibits the extent to which they can confidently communicate this information to students. Current teacher training programmes do not adequately equip teachers to deliver ESD with respect to content and pedagogical methods. The majority of teachers surveyed in Guyana were unaware of the existence of any formal training programme on climate change within the educational system, and unaware of any existing plans/programmes and strategies aimed at educating students on climate change and DRR. Because teachers have a tendency to 'teach to test' concepts such as climate change and disaster risk reduction, it is important to include these issues in the assessment framework based on defined learning outcomes across educational levels.

Need for greater coordination and communication

In Guyana, given the lack of a comprehensive CCESD policy, different stakeholders work on education and climate change issues within their own domains. This made it difficult to establish the Team of National Partners with members from different organizations and fields and a clear demarcation of roles and responsibilities. Limited horizontal and vertical integration among and within agencies coupled with a lack of integration of different programmes aimed at promoting CCE in Guyana meant that communication and information sharing was weak.

3.4.3 Sustainability

The positive outcomes and benefits resulting from the UNESCO CCESD programme are likely to continue into the future. The *CCESD Follow-Up Plan and Strategy* should help inform policy development and actions in respect of CCE at various levels of decision-making in the education sector. Teachers involved in the programme showed genuine interest in learning about and embedding CCESD into their teaching and learning practice.

The fact that the CCESD programme was implemented with limited funding should provide some hope that future funding can be leveraged to deliver more positive outcomes.

4. Conclusions

Guyana has yet to develop a national policy framework for CCESD and this lack must be addressed to provide a clear, coordinated path forward. CCESD-related projects implemented prior to UNESCO's CCESD programme have helped incorporate Climate Change Education into the nursery school, primary and secondary level curricula. However, many teachers still do not have formal training and they lack sufficient knowledge about climate change and education for sustainable development to integrate this knowledge into their classroom activities.

The UNESCO CCESD programme resulted in the creation of the *Final CCESD Follow-up Plan and Strategy – Guyana*. This should strengthen teacher training and further integration of CCESD into the TVET curriculum.

Mauritius

HIGHLIGHTS

- The CCESD programme developed a successful partnership with the national teacher training institute.
- The programme increased participants' awareness of climate change and of the importance of CCESD.
- The new national SD policy "Maurice Île Durable" provided an opportunity to scale-up ESD and CCE in the country. However, there is a need for greater policy integration and the development of teacher resources and toolkits.

1. Introduction

The Republic of Mauritius (Mauritius) is a small island nation located in the Indian Ocean off the coast of Africa. It consists of the island of Mauritius, along with the islands of St. Brandon, Rodrigues, and the Agalega Islands. Though Mauritius has few natural resources, it has experienced a rapid economic transformation since independence in 1968, with gross domestic product per capita growing from US\$1,107 in 1980 to US\$8,120 in 2012.⁹

Mauritius has experienced the effects of climate change over the past ten years. This includes rising temperatures and sea level, the latter being of particular concern for the low-lying Rodrigues Island. There has also been an eight per cent decrease in rainfall, as well as the lengthening of the intermediate dry season which has led to periods of drought. Climate change is causing frequent catastrophic flooding and loss of lives, with short, intense rainfall events that can destroy agriculture. The coastal zone, agriculture, water and marine resources, health and tourism sectors have been identified as being most vulnerable to climate change-related events.

2. Education system

Mauritius has free universal primary and secondary schooling, compulsory until the age of 16. There are four universities in Mauritius, and the University of Mauritius is free for all full-time undergraduate programmes.

The needs analysis conducted as part of the Climate Change Education for Sustainable Development (CCESD) country programme highlighted several constraints in the Mauritian education system. There was limited local capacity to modify curricula. There was also a lack of innovative and active teaching and learning strategies at the school level, with an overreliance on transmitting factual knowledge to students as opposed to a more participatory learning approach. Evaluation strategies in the classroom also tended to be summative (exam-based) rather than formative.

3. The national Climate Change Education for Sustainable Development programme

3.1 Approach

UNESCO contracted the Mauritius Institute of Education (MIE) in 2011 to implement the CCESD country programme. The MIE is the national teacher training institution and provides training to both pre-service and in-service teachers. It also provides leadership in curriculum planning and educational research. For the CCESD pilot programme, the MIE study involved interviews and desktop research. The desktop research included a literature review of CCESD-related documents, curriculum material and Acts, policies and regulations.

3.2 Current Status of CCESD

There are several ministries dealing with climate change in Mauritius. Foremost is the Ministry of Environment and Sustainable Development (MoESD). The Ministry of Education and Human Resources is responsible for formal education at pre-primary, primary, pre-vocational, vocational and secondary levels. Other ministries dealing with climate change include the Ministry of Arts and Culture, the Ministry of Social Integration and Empowerment and the Ministry of Social Integration.

To date, the MoESD has been the most active in supporting environmental education (EE) and later education for sustainable development (ESD). The 2002 *Environment Protection Act* (EPA) empowers the MoESD to develop EE and ESD programmes for a range of participants. Other government Acts and mechanisms

9. World Bank Group, 2013.

that facilitate MoESD's role in EE and ESD include: the 2007 *National Environment Policy*; an Environment Coordination Committee; Environmental Liaison Officers designated in each sectoral ministry; and sectoral ministries assigned enforcement powers under the EPA.

Despite these mechanisms, the study found that the concept of ESD has until recently been taken in a rather restricted and compartmentalized manner. The Ministry of Education and Human Resources has consistently attempted to embed sustainable development into the science syllabus, but until recently, EE and ESD have largely been relegated to the areas of non-formal and informal education. Relevant, level-specific and appropriate teaching and learning resources on climate change were found to be scarce, as was adequate coverage of climate change and disaster risk reduction education in teaching and learning practices. The compartmentalization of the curriculum development process led to a dilution of ESD in the curriculum materials.

Lastly, the study found that there was no existing coordination and partnership among stakeholders, including non-government organizations, in promoting CCESD at school. There was also inadequate support from management to implement ESD, and management practices generally did not endorse school participation in extracurricular activities.

The concept of ESD entered the development discourse in 2008 when the Prime Minister of Mauritius announced a new long-term vision to make Mauritius a sustainable island, entitled *Maurice Île Durable* (MID). MID identifies five pillars, namely energy, environment, education, employment and equity (the 5Es). The

government set up a Rs1.3 billion (approximately US\$39 million) MID Fund for the 2008-2011 period, representing about 0.2% of GDP. It is foreseen that MID will lead to the development of a *National Policy for a Sustainable Mauritius*, and the CCESD project has helped inform the preparation of this policy.

There are a number of Working Groups as part of the MID initiative - Working Group 5 is tasked with education. Stakeholders in the MID initiative recommended that one institution centralize all sustainable development educational programme planning, and that a reorientation of the entire curriculum was required to promote sustainable development at all educational levels. The challenge is to implement the MID policy in all sectors nation-wide.

There are a range of other initiatives to support ESD, including the Green School Project and Environmental Literacy Programme. Mauritius was also one of 20 countries that participated in the Africa Adaptation Programme.

3.3 Capacity Building Activities

The CCESD pilot came at an opportune moment for the government, as the capacity-building exercise for secondary school teachers was coherent with its MID policy. The MIE based its capacity-building activities on the dedicated ESD packs developed by UNESCO. This approach aimed to give teachers confidence in facilitating CCESD inside and outside the classroom, to help learners understand the causes and consequences of climate change, and bring about changes in attitudes and behaviours to mitigate and adapt to the impact of climate change.

Table 1. Objectives of capacity-building workshops

Workshop	Objective
School managers and stakeholders (e.g. school inspectors)	To bring awareness of CCESD at secondary school management level and encourage schools to participate actively in CCESD-related activities
Curriculum developers	To integrate CCESD into the national curriculum through a review process and developing capacity among curriculum developers from various subject areas
Secondary school teachers/ MITD trainers	To adapt existing teaching and learning resources to CCESD, develop additional and complementary CCESD-related materials for lower secondary schools, and implement those adapted and developed teaching and learning resources at lower secondary school level.
GOs, NGOs, representatives of the Ministry of Education and Human Resources	To reinforce working partnerships and effective coordination among various stakeholders involved at secondary school level while accelerating CCESD integration

Workshops were held for different target groups, including MIE heads of schools and heads of department, course coordinators, teacher trainers and curriculum developers, teachers, instructors and representatives of government and non-governmental organizations. This phase was followed by the implementation of CCESD in four schools. There was one government secondary school and three government subsidised/private secondary schools involved, targeting Grade 7 and Grade 10 students (respectively 12 and 15 years old). CCESD was integrated into lessons in a variety of subjects including computer studies, dance, English, French, Hindi, home economics, mathematics, physical education and science. The objectives of the capacity-building workshops are outlined in Table 2. Similar workshops were organized on Rodrigues. Government and non-government representatives were invited to participate in the workshops.

3.4 Outcomes

3.4.1 Achievements

High-level support and coordination

MIE participants felt that the workshops demonstrated the strong support from management as well as greater coordination and partnership among the MIE Core Research Team (CRT) and other colleagues. The Director of the MIE, who led the MIE-CRT, made a commitment to accelerate the integration of CCESD in the activities of the MIE.

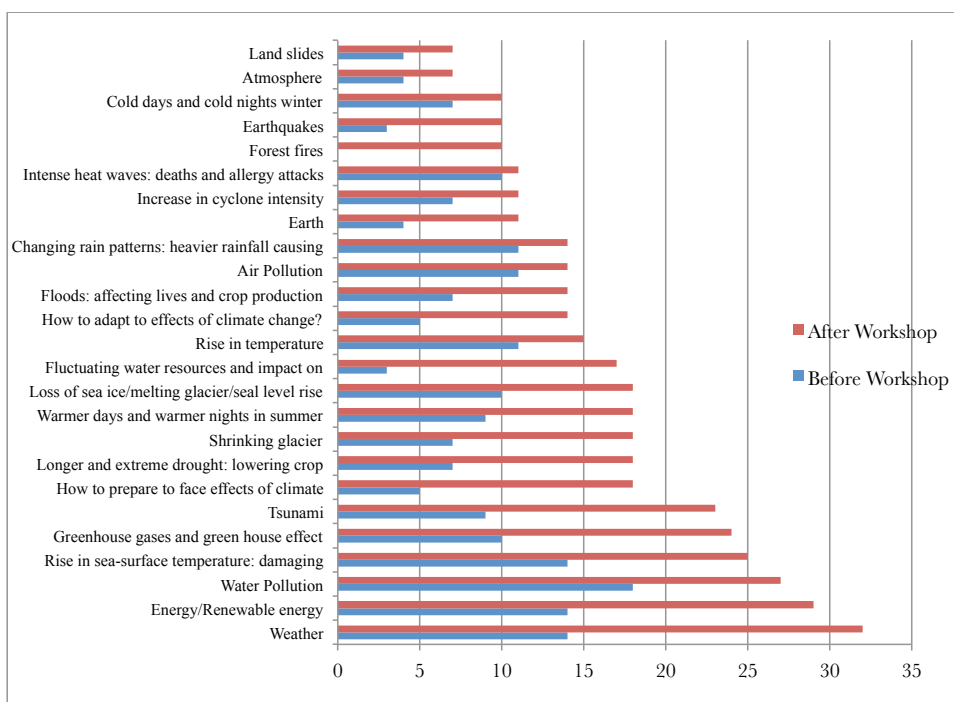
Innovative tools and materials to integrate CCESD

As part of their workshop, MIE heads of schools developed a framework that provided a systemic broad-brush view of how each discipline could contribute to CCESD. MIE teacher trainers developed tools that would support the integration of CCESD in their particular disciplines. They prepared materials that were highly innovative, demonstrating that the workshops had prompted thinking about ESD within the MID framework.

Increasing knowledge and awareness of climate change

Feedback from both MIE heads of schools and teachers indicated that the workshops changed their knowledge and perception about climate change and ESD. Teachers stated that the CCESD pilot had helped to them understand the impact of climate change, how communities can adopt climate related adaptation and mitigation strategies, and how to produce resource materials to integrate CCESD into their teaching. There was a significant increase in the percentage of teachers who stated that they would integrate topics related to climate change mitigation and adaptation and disaster reduction risk into their lessons (Figure 2). Following the workshop, teachers were found to use a wider variety of teaching tools such as multimedia resources, brochures, role play, fieldwork and outdoor activities.

Figure 1. Percentage of teachers who would cover topics related to climate change, mitigation and adaptation and disaster reduction risk, before and after the CCESD workshop



3.4.2 Challenges

While participants from the MIE reacted positively to the workshops, it was felt that non-MIE participants' reactions were more mixed.

High-level support

MID provides a supporting framework for curriculum revision. However, more advocacy and capacity-building targeting policy-makers may be needed, to increase awareness both of the imminent dangers of climate change and of the need to integrate CCESD into current educational curricula. There is also tension between the needs expressed by the MID Working Group 5 report and what the lead Ministry sees as feasible in terms integrating CCESD into the curriculum. This may prevent progress.

Development of teaching materials

The development of teaching resources by school teachers was variable on the island of Mauritius. Secondary school teachers were less concerned about climate change, and felt that the development of instructional materials was the task of the MIE. They were also less receptive to developing their own instructional materials. Accessing appropriate materials and resources was considered a major hurdle in maximising the benefits of the training and ensuring a smooth implementation of CCESD. Conversely, teachers from Rodrigues, who worked in a more collegial, less hierarchical workshop environment, were more receptive to resource development.

CCESD assessment

As teaching remains largely exam-oriented, examiners need to be trained to prepare assessment and examination papers that reflect CCESD. Textbooks could include a few questions that make reference to climate change issues to trigger student research. Such measures would provide a strong incentive for teachers to include climate change in their lessons.

3.4.3 Sustainability

The delivery of capacity-building workshops targeting managers, teacher trainers and curriculum developers within the MIE will embed CCESD into future teacher training and contribute to the sustainability of the pilot's achievements.

The CCESD pilot helped shift ESD from the margins of the Ministry of Environment and Sustainable Development towards a more integrated approach, involving the Ministry of Education and Human Resource Development as well as the Ministry of Tertiary Education, Science Research and Technology. Some of the participants in the MID Working Group 5 were also drivers of the UNESCO CCESD programme at the Mauritius Institute of Education, and this may have contributed to the enthusiasm and motivation with which the UNESCO CCESD pilot programme was received.

The timing of the pilot coincided with a push to implement the education component of the MID, and the lessons from the pilot can inform the MID education strategy and action plan, thereby further contributing to the sustainability of the CCESD programme.

4. Conclusions

Building capacity in the MIE, Mauritius' teacher training institute provided a strong foundation for continuing to build CCESD capacity within schools. Through the involvement of heads of departments, curriculum developers, and teacher trainers, the pilot programme has led to a shift in thinking and a greater understanding of the importance of CCESD, and the role different stakeholders can play. The MIE is now in a strong position to continue to train new teachers, and provide further up-skilling of existing teachers, thereby contributing to the sustainability of the pilot's achievements.

Partnering with the MIE in the implementation allowed a large number of participants to be reached. Workshops held off school, and involving both teachers and school managers, were more successful in achieving desired objectives compared to those held within schools. However, the pilot demonstrated the need for a transformation of the curriculum, including the manner in which learning is assessed: the focus on exam-oriented teaching is a major barrier to CCESD. Teachers must also be provided with teaching resources to support CCESD.

South Africa

HIGHLIGHTS

- The CCESD programme worked in synergy with existing capacity-development programmes.
- It engaged curriculum advisors and built greater awareness of climate change challenges.
- South Africa needs to build greater policy coherence to harmonize wide variations in CCE approaches and programmes.

1. Introduction

South Africa is located at the southern tip of Africa and features nine different biomes and three of the world's biodiversity hotspots.

South Africa faces significant mitigation and adaptation challenges regarding climate change. It is a water-stressed country, and climate change is likely to worsen the challenges being faced by the water sector. Predicted impacts of climate change for South Africa include increases in the distribution and intensity of drought, reduced agricultural crop yields impacting on food security, biodiversity loss, higher growth rates of invasive species, coral bleaching, coastal erosion and loss of infrastructure, and an increase in the areas affected by vector-borne diseases.¹⁰ It is predicted that the poor will be the most affected by such impacts.

2. Education system

South Africa's education system is divided into primary, secondary and higher education, and technical and vocational education and training (TVET). Non-formal or community-based education is also an important form of education in South Africa, especially in relation to climate change. Education and training is supported and regulated by a structured quality management system, governed by the *National Qualifications Act* of 2008, which covers school level, higher and teacher education and TVET.

Non-formal education initiatives in South Africa have been important in improving the education level of people of African origin and women in particular.¹¹ There is no formal system of quality assurance

associated with non-formal education, but there are indirect associations with quality assurance systems in the formal education sector.

Teacher education programmes for both initial teacher training and up-skilling are mainly located in universities, as colleges of education were amalgamated into universities after 1994. The Department of Basic Education plays an important role in in-service teacher education, and a new policy has identified the need for professional learning communities for teachers. NGOs and parastatal organizations also provide support to teachers, but this is often ad hoc and is driven by partner interests.

3. The national Climate Change Education for Sustainable Development programme

UNESCO commissioned the Delta Environmental Centre to carry out a baseline review of Climate Change Education in South Africa. The field-based research and capacity-building activities were undertaken primarily by the South African National Biodiversity Institute (SANBI), with support from Rhodes University's Environmental Learning Research Centre.

3.1 Approach

The South African report was primarily a desktop study complemented and supported by policy analysis, a number of key informant interviews, observation of teacher education programmes and analysis of learning support materials, informed by the Delta Environmental Centre's baseline review. UNESCO, in cooperation with SANBI, developed and implemented capacity-building activities for Climate Change Education policy and planning, curriculum development, teacher-training as well as support for reforming and greening of TVET programmes and developing disaster risk reduction (DRR) school plans. The Rhodes University Environmental Learning Research Centre provided monitoring and evaluation support services and developed the national case study, drawing on SANBI's and other national Climate Change Education (CCE) activities.

10. DEA, 2011.

11. Blom *et al.*, 2007.

3.2 Current Status of CCESD

South Africa has had an enabling policy environment for CCE that dates back to early African National Congress (ANC) policy in the mid-nineties. This was based on a social justice and human rights orientation to environmental education and, later, education for sustainable development (ESD). These concepts appeared in the *White Paper on Education and Training* in 1995, the *South African Constitution* in 1996 and in subsequent curriculum policy that has been revised since 1996.

In 2011, the Department of Environmental Affairs (DEA) released a *National Climate Change Response White Paper* that set the parameters on how climate change needed to be addressed. It noted that CCE should be part of the broader ESD framework. Specifically, it stated that climate change knowledge needed to be mainstreamed into education and training curricula, under the responsibility of the Department of Basic Education (DBE), and the Department of Higher Education and Training (DHET). However, there is no coordinating mechanism between the two government departments focussing on CCE, and none of them have, as yet, developed a strategy to coordinate or implement CCE in a cross-cutting manner. Education sector policy-makers interviewed as part of the South African case study indicated that they have not been involved in the climate change response paper, and climate change policy-makers indicated that at this point, they were not yet prioritizing education.

The *White Paper* also addressed climate change in TVET, but there is not yet an explicit national strategy to meet the skills needed for greening South Africa's economy. Allocation of funds for green skill development remains ad hoc, as there is no nationally established governmental fund allocation for green skill development programmes.

One of the key challenges for South Africa is to mainstream climate change into its education system via the national systems of quality assurance and their associated programmes. There has been some progress in this regard, but more needs to be done.

The 2010 *National Curriculum Statement* has some elements of environmental education and CCESD. Different concepts of climate change are found in different curricula but are not necessarily linked. Similarly, learning support materials used for climate change reflect a wide range of orientations and approaches, but not a clear synergy with national policy.

No specific policy exists to indicate that climate change and environmental issues should be included in education for teachers or environment officials, which leads to variations in the level and content of capacity-building and training in these areas. Generally, CCE capacity-building has been conducted in the environment and sustainability sectors by a number of governmental and non-governmental institutions whose approaches to CCE vary widely.

A new teacher education development programme – Fundisa for Change¹² – has been established as a partnership programme involving a number of South Africa's major environmental organisations, including state, parastatal, NGOs and private companies. It is a capacity-development programme for teacher educators and teachers to help them integrate environment and sustainability learning in their practice. The programme represents a concerted effort to deal with the issues of strategic coordination and standard-setting through an accredited programme.

In the TVET sector, some programmes have started to engage TVET institutions in short courses to build capacity for sustainability and climate change to develop skills for the green economy. However, there are significant skills shortages. At the higher education level, a number of South African universities are demonstrating trans-disciplinary research and trans-disciplinary teaching, guided by the *Global Change Grand Challenge National Research Plan*. Other projects aim to attract young students to earth system sciences and to sustainability science studies.

3.3 Capacity-building activities

The SANBI team conducted CCESD workshops for government education officials, teachers and teacher educators in Mpumalanga, North West Province and in Gauteng Province. Due to limited resources and to ensure greater coverage, the implementation team developed a partnership with Fundisa for Change, which was organizing similar capacity-building workshops.

The CCESD workshops were held to expand curriculum advisors' and educators' knowledge of environmental topics, to support their teaching of the curriculum and to build capacity towards fulfilling their role of adapting and translating the UNESCO CCESD materials to South Africa's specific needs. In total, 49 education officials attended the workshops,

12. See: <http://www.fundisaforchange.co.za/>

comprising 16 educators, 31 curriculum advisors and two Department of Basic Education officials.

The monitoring team also observed two other Fundisa for Change CCE courses in Northern and Western Cape, part of a UNESCO CCE course for teacher educators from South and East Africa offered at Rhodes University, and part of the Habitable Planet Programme also at the university level.

Other initiatives that are supporting climate change education in the South Africa include Sandwatch, which conducted a workshop on CCE for UNESCO, and the Planetears programme for university students that is conducted by the Applied Centre for Climate and Earth System Science (ACCESS).

The SANBI and the monitoring team also undertook discourse analysis of up to 20 different learning resources to identify the assumptions and approaches to CCE that are preferred by various education and training sector providers.

3.4 Outcomes

3.4.1 Achievements

Integration and synergy with existing programmes

The CCESD pilot in South Africa added to, and integrated with, existing capacity-building initiatives for education staff, primarily the Fundisa for Change programme. This allowed the UNESCO programme to expand its coverage and integrate with an already-established initiative and take advantage of established networks and local knowledge of educator's needs.

Observations of the Fundisa programme indicated it promoted CCE within a new science approach as well as within an ESD and mitigation framework.¹³ The practical classroom work promoted student-centred learning that was collaborative, critical and action oriented. Participants of the CCESD workshops also reported that the workshops provided space to develop, practice and improve their interaction skills.

Reaching out to curriculum advisors

The CCESD and Fundisa for Change workshops began engaging curriculum advisors with Climate Change

Education, creating an entry point for further promotion of CCESD in curricula and school programmes. SANBI's CCESD workshop for curriculum advisors in Pretoria was well attended with a wide geographical reach. Participant feedback revealed that the workshop created new understanding and knowledge of climate change concepts and triggered a broad discussion among curriculum advisors about the concepts of biomes and climate change and how they could link these to the curriculum.

3.4.2 Challenges

Adapting to the local context

Feedback from secondary teachers on the UNESCO workshop highlighted the need to make capacity-building materials more relevant to the participant's context, knowledge and experience. This was also reflected in the review of UNESCO resources being used in South Africa, which indicated that they were mainly generic and were broadly accessible to all learners, but that they lacked contextualization. The *Climate Change Starters' Guide*, while useful for a variety of sectors, needed a stronger knowledge focus for the South African context, as teachers' knowledge of new topics such as climate change and biodiversity was generally weak.

Different approaches and content

The results of the UNESCO workshops and Fundisa programme indicate that teacher education programmes for climate change differ in their orientation, scope and content. Different programmes reflect multiple ways of knowing about climate change, and multiple perspectives on climate change issues. Most programmes appear to be driven by the resources and/or the concepts and experience favoured by the facilitators.

A similar finding emerged from the discourse analysis of the educational materials, again revealing a possible lack of national dialogue on CCESD and its relationship to climate change policy. This analysis showed a broad mix of approaches, with few focussing clearly or coherently on the policy directives for climate change response, as outlined in the *National Climate Change Response Paper*. There is ostensibly inadequate national dialogue as yet on how to approach Climate Change Education in relation to climate change policy in South Africa.

13. A new science approach is an integrated, trans-disciplinary approach to teaching and learning science that promotes holistic knowledge and understanding.

3.5 Sustainability

The UNESCO CCESD case study findings and recommendations will be used to form the basis of engagement with climate change and education policy-makers in South Africa and to stimulate a national dialogue on how to respond to climate change through education and training. The case study report will also be shared during the Fundisa for Change Education for Sustainable Development Teacher Education Conference in 2014. This will allow educators, curriculum developers, education department officials and other stakeholders the opportunity to reflect on the outcomes and lessons of the CCESD programme and the implications for progressing CCESD within South Africa.

4. Conclusions

There is great diversity in the orientation and approaches to Climate Change Education in South Africa. This diversity is to be valued as it reflects the different contexts and issues being faced by communities in relation to climate change.

However, much more can be done to strengthen and expand Climate Change Education. The role of education, or CCESD, is not adequately reflected in major national climate change policies. While the *National Climate Change Response White Paper* includes a strong focus on education, this is yet to be implemented through a strong partnership with the DBE and DHET. Likewise, environment and climate change are not adequately reflected in education policies, and this makes it difficult to ensure curriculum coherence. Curriculum development should take into account that knowledge related to climate change is constantly evolving.

A clear conceptual framework is needed for environment and sustainability education in South Africa that can develop progressive knowledge, and that can reflect the full scope of the policy and context in which environmental learning is to occur. Such a conceptual framework that is inclusive of climate change responses as per the *National White Paper on Climate Change Response* is yet to be developed.

Tuvalu

HIGHLIGHTS

- The CCESD programme reached government staff, teachers and community representatives.
- New curriculum material was developed integrating CCESD.
- There is an overarching need to strengthen national teacher training and professional development.

1. Introduction

Tuvalu is a Pacific small island state consisting of four reef islands, five atoll islands, and many more islets within a sea area of approximately 900,000 square kilometres. Around fifty per cent of the total population of 10,698 live in Funafuti, the capital.

Tuvalu has a parliamentary-style central government and a form of local government on each of the eight main islands called the Falekaupule. The Falekaupule is made up of island elders or 'matais' and forms the decision-making part of the local government.¹⁴ The island councils enjoy a significant level of autonomy to determine development priorities within the national government's overall development goals.

Tuvalu is classified as a least developed country and it faces a large number of developmental challenges. Environmental challenges consist of polluted groundwater resources, salt-water inundation and coastal erosion. Tuvalu faces problems with solid and liquid waste disposal that impact on the water quality of the freshwater lens and lagoon, as well as on human health and general amenity. The pollution of the lagoon has led to increased instances of ciguatera poisoning from consumption of contaminated fish.

2. Education system

Tuvalu has universal education for all children from the ages of 6 to 15. There are a total of 18 pre-schools, 10 primary schools and two secondary schools. The Department of Education is responsible for providing

the curriculum and resources to support the delivery of learning programmes in the formal education sector, including teachers' wages and related expenses. The Department of Education has a strong partnership with all Falekaupule and this relationship is important to achieve an effective and functioning education system.

Tuvalu's education sector faces major challenges. Student learning levels are low, with schools facing high pupil-teacher ratios. Many teachers have received little to no training, and ongoing professional development is limited. There are insufficient learning materials, especially with local content and in local languages, and in some cases, basic curriculum materials have not been produced.

3. The national Climate Change Education for Sustainable Development programme

The CCESD country programme was implemented by the University of Auckland (UoA) between July and September 2012. The UoA team consisted of two consultants working closely with the Department of Education, who coordinated meetings and appointments with schools and other government stakeholders. The UoA engaged with a number of CCESD related stakeholders in Funafuti over three-week-long visits.

3.1 Approach

The UoA used several methods to conduct the CCESD needs assessment survey. First, desktop research of existing education policy and curriculum documentation was conducted prior to the first in-country visit. Second, stakeholder interviews were held with key personnel from the Department of Education and the four educational institutions (primary, secondary, University of the South Pacific and TVET) in Funafuti. Finally, teaching staff were observed in the classroom to assess their level of competency and pedagogical knowledge and skills. The data collected was combined into a summary report, *CCESD in Tuvalu*, that captured the key findings and recommendations used to inform the capacity-building activities.

3.2 Current Status of CCESD

The survey found that government-endorsed policies, plans and strategies that included some limited

14. 'Matais' are all male, aged 50 and above, and represent the indigenous clans of the particular island. In Tuvalu, 'youth' is categorised as ages 18 to 49. A 2007 report noted an imbalance in representation by women at all levels of political decision-making in Tuvalu (Kofe & Taomia, 2007).

components of ESD, CCESD and DRR were present in Tuvalu. However, there is a gap between both the policies and plans and their implementation on the ground, which can be largely explained by a lack of both capacity within the government and the formal and non-formal education sector. Adding to these constraints is a lack of funding to support the education sector and a number of education sector specific challenges outlined in Section 2.

In 2005, Tuvalu developed its guiding framework for sustainable development entitled *TeKakeega II, National Strategy for Sustainable Development 2005-2015*. This and other plans informed the later development of the *National Strategic Action Plan for Climate Change and Disaster Risk Management 2012-2016*. The action plan contains strategies to include Climate Change (CC) and Disaster Risk Reduction (DRR) material into the school curriculum and also develop resources to assist in both student and teacher training. While the action plan contains detailed CC and DRR adaptation measures, its implementation is dependent upon external donor funding. There is no recurrent government funding allocated to CCESD in Tuvalu and most formal and informal sector education and outreach are funded by external donor support.

The Ministry of Education is the main driver of CCESD in Tuvalu. Other government stakeholders involved in CCESD include the Ministry of Environment, the Disaster Risk Management Office, the National Disaster Committee, and the Ministry for Home Affairs. Fourteen other stakeholders were found to be involved in implementing CCESD related projects in Tuvalu.¹⁵ Apart from its one curriculum developer, the Department of Education has very limited capacity to write or rewrite units of work to embed CCESD into the curriculum without external assistance.

In the formal education sector, climate change is taught mainly through science and geography subjects. However, information about climate change adaptation responses that could be implemented in Tuvalu and what the international community was doing to support mitigation and adaptation measures was absent. These factors negatively impact upon the ability for teachers to deliver effective lessons. Some teachers, who had no formal

teaching qualifications, commented that they found it hard to include new teaching elements such as CCESD.

In the non-formal education sector, past community awareness-raising activities have focussed on transmitting knowledge to island leaders, with the hope that knowledge will trickle-down to the wider community. Other projects that contain CCESD elements exist in the areas of food production, reducing coastal erosion and disaster risk reduction.

3.3 Capacity-building activities

The capacity-building activities delivered by the CCESD pilot programme sought to respond to the requirements identified during the needs assessment phase. Capacity-building of teaching and government staff was organized through workshops and practical activities that were delivered in an entertaining and engaging manner using adult learning ESD principles.¹⁶ Through these activities, the CCESD pilot programme reached approximately 80 individuals from both the formal education sector (government departments and schools) and the non-formal education sector (NGOs and church groups). Most activities involved representatives from organizations in Funafuti.

Capacity-building of government representatives

A two-day CCESD capacity-building workshop was held with staff from various government departments. During the workshop, the facilitators assessed the participant's knowledge about climate change, ESD and DRR using information from the 2012 Tuvalu *Climate Change Profile* document compiled by the Secretariat of the Pacific Community's Global Climate Change Alliance: Pacific Small Islands States (GCCA: PSIS) project.¹⁷

Practical workshops with primary and secondary teachers

Capacity-building workshops were delivered to some 35 primary and secondary school teachers and principals from the four schools in Funafuti. Twenty-five participants took part in a practical demonstration on how to facilitate a Sandwatch workshop (see Box 4).

15. UNESCO, FSPI, TANGO (FSPI in partnership with Plan International), University of the South Pacific with support from the Global Climate Change Alliance, UNICEF in partnership with AusAID, Tuvalu Red Cross, National Youth Council, National Women's Council, Tuvalu Climate Change Adaptation Network (TuCAN), Ekalesia Kelisiano Tuvalu (Protestant Church of Tuvalu) and other religious organizations, Alofa Tuvalu

16. Adult learning and ESD principles included use of outdoor activities (Sandwatch workshop), singing and dancing, activity card games and critical thinking exercises.

17. See: <http://www.spc.int/images/climate-change/countryprofile/TuvaluCCProfile.pdf>

Box 4: Sandwatch

Supported by UNESCO, The Sandwatch Foundation provides a framework for school children and local communities to work together to critically evaluate the problems facing their beach environments and develop sustainable management solutions. See: <http://www.sandwatch.ca/>

Drafting new curriculum integrating CCESD

A curriculum-writing workshop was held with government staff and primary and secondary school teachers. The workshop resulted in the creation of new units of work for some subjects that included CCESD.

Discussing climate change with community representatives

A workshop was held with island leaders representing the Falekaupule from most of Tuvalu's main islands, as well as representatives from youth and women's groups. The facilitators assessed the island leaders' knowledge of CCESD and led a discussion about climate change impacts and adaptation. Some participants noted it was the first time they had been given some concrete information about what climate change would mean to their islands and what adaptation activities might consist of.

3.4 Outcomes

3.4.1 Achievements

Embedding CCESD in the curriculum

Overall, the CCESD pilot initiative increased the capacity of the Department of Education staff to embed CCESD into the curriculum of the formal education sector. As part of the programme, new units of work for existing subjects in the curriculum were created, including water quality, clean environment and sustainable fishing and planning.

Building teacher capacity

The capacity of primary and secondary school teachers was also strengthened to assist them to deliver lessons using ESD principles. Capacity-building activities resulted in teaching staff being better able to develop units of work and use ESD teaching principles in delivery. The workshops held with teaching staff from schools in Funafuti proved to be very effective in both motivating teachers to change their practices and extending their knowledge about climate change to include climate change adaptation.

3.4.2 Challenges

Government constraints

Originally, it had been suggested that the Department of Education would form a CCESD Committee to help develop a national follow-up plan. However, without a commitment from stakeholders in government and the formal and non-formal education sector, this did not take place. While stakeholders supported the idea of forming a CCESD Committee, most refrained from volunteering to participate due to resourcing constraints and existing time pressures that are common in PSIS.¹⁸

National plan and follow-up

A national plan of action for CCESD (follow-up plan), initially to be created by the proposed CCESD Committee, was not delivered. Information gathered during the early phase of the programme indicated that it was necessary to let the government lead the process to develop a national plan of action for CCESD at a pace that is manageable by the small number of people involved. A Communication Officer for climate change was to be appointed to act as a conduit across government and this was to be a key facilitating factor in the creation of a future national plan of action for CCESD.

Wider education sector challenges

The formal education sector needs to address a number of barriers before CCESD can be mainstreamed. There are not enough trained teachers with strong pedagogical skills to teach climate change in an interdisciplinary and participative manner. Moreover, the limited knowledge on climate change impacts and adaptation opportunities prevents teaching staff from having the confidence to integrate climate change and disaster risk reduction into their lessons. The lack of trained teachers and limited pedagogy has been acknowledged as a factor limiting the ability to integrate CCESD into the formal education system.

Programme timing and delivery

Building trust between trainers and trainees, especially in Pacific Small Islands States, was identified to be critical to the successful delivery of training programmes. The project duration of three months and in-country action period of three weeks was felt to be too short to build this trust and have a large impact at the various levels targeted by the programme.

18. PSIS government departments are often understaffed, and existing staff often perform more than one role leaving them short of time to take on additional commitments. Teachers, principals and NGO staff face similar challenges.

3.5 Sustainability

The training provided by the UNESCO CCESD programme has established a strong basis on which other projects can build. Notably, the Child-Centred Climate Change Adaptation project, implemented by the Tuvalu Association of Non-Government Organisations, has delivered further training to continue improve teacher capacity and skills. The project is also continuing the integration of climate change and ESD into the curriculum by developing a culturally-relevant book of stories and reading toolkit that can be used in the classroom to engage and educate children about climate change adaptation.

Despite the lack of an overarching CCESD strategic plan, there is evidence that CCESD capacity-building activities have been acknowledged by the national leadership. In September 2012, the Director of Education decided to continue a programme of professional development in CCESD for teachers from 2013 to 2015. Additionally, an implementation plan for the *Tuvalu National Curriculum Policy Framework* (TNCPF) will be developed to integrate CCESD into the curriculum and expose more teachers to CCESD.

UNICEF, in partnership with AusAID, is implementing an 'Education for All' programme aiming to improve the education sector in Tuvalu, including a development programme for educators.¹⁹ While this programme does not focus on Climate Change Education, it does have teacher training as a main focus. This teacher training should help future CCESD-focused programmes to be more effective.

4. Conclusions

The UNESCO CCESD pilot programme reached government staff, teachers and community representatives via capacity-building workshops. Overall, it provided a strong foundation to strengthen the Department of Education's capacity to embed CCESD into the curriculum of the formal education sector and to strengthen CCESD in teacher education programmes. The workshops held with teaching staff from schools in Funafuti proved to be very effective in both motivating teachers to change their practices and building their knowledge around climate change.

The programme led to the development of new units of work on CCESD that can be integrated into the curriculum. It did not, however, result in the improvement of existing or creation of new policies, plans and strategies that include CCESD.

Better coordination and resourcing of the non-formal education sector will improve the effectiveness and reach of community awareness programmes on climate change, and support the efforts made in the formal educational sector.

19. UNICEF, 2011.

COUNTRY PROFILES

16 National Policy Reviews

This section provides an overview of the status of Climate Change Education (CCE) across sixteen countries and regions: Australia, Bangladesh, Brazil, Chile, China, Costa Rica, Denmark, Dominican Republic, England (UK), India, Indonesia, Manitoba (Canada), Philippines, Republic of Korea, South Africa and Viet Nam.

Each country profile presents Education for Sustainable Development (ESD) and Climate Change Education (CCE) approaches to education and skills development policy, as well as ESD and CCE in national climate change and sustainable development policies.

ESD and CCE are being actively developed in some countries, whereas in others they remain marginal. While implementing CCE and ESD needs to take into consideration each specific local and national context, the country profiles provide insights and lessons as to how to effectively implement CCE and avoid the barriers that some countries have experienced.

List of common acronyms

CCE	Climate change education
CCESD	Climate change education for sustainable development
DRR	Disaster risk reduction
EE	Environmental education
ESD	Education for sustainable development
NGO	Non-governmental organization
TVET	Technical, vocational education and training
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization

The country profiles are based on commissioned research, which was undertaken in 2013.

Australia

Introduction

The Commonwealth of Australia is the world's largest island, and the world's sixth largest country by area. Australia's relatively small population of nearly 23 million is highly urbanized, with most of the population centres situated on the eastern seaboard.

Australia's federal government outlines national policy and action plans within different areas – including education – that state and territories then interpret, adopt within legislation and implement. The Council of Australian Governments (COAG), formed in 1992, provides a forum for debate and coordination between federal, state and local governments. The Council for the Australian Federation, formed in 2006, coordinates the state governments' responses to key national policy issues.

Schooling in Australia is divided into primary and secondary levels and is compulsory for children aged 5 to 15 or 17, depending on the jurisdiction. Tertiary education is divided into vocational education and training (VET) and university.

CCE AND ESD in national education and skills development policies

Australia has been at the forefront of education for sustainability,²⁰ adopting in 2000 a national plan entitled *Environmental Education for a Sustainable Future*. A number of initiatives and bodies were created to implement the national plan, including the Australian Sustainable Schools Initiative and Australian Research Institute for Environment and Sustainability. These provided a strong foundation for Australia's strategy, launched in 2006, to respond to the UN Decade of ESD. The strategy set out the goal to mainstream sustainability through a holistic approach that engages the community through education and lifelong learning. Whereas climate change was referred to as one of a number of environmental concerns in the first national plan, a new plan launched in 2009, entitled *Living Sustainably: the Australian Government's National Action Plan for Education for Sustainability*, had a greater focus on climate change and its impacts on other natural resources within

a wider global context. The new plan incorporated climate change within education for sustainability, rather than establishing a new and potentially competing field of Climate Change Education. Australia introduced its first-ever national curriculum in 2014, including sustainability as one of three cross-curriculum subjects.

Since 2009, Climate Change Education has been most evident in the VET sector. COAG endorsed the *Green Skills Agreement* in 2009, and the Ministerial Council for Vocational and Technical Education published the *National VET Sector Sustainability Policy and Action Plan (2009-2012)*. These initiatives aimed to provide workers with the skills needed to transition to a low-carbon economy and VET teachers with suitable training packages to promote education for sustainability.

CCE and ESD in national climate change and sustainable development policies

In 2010, the Australian Government published a position paper entitled *Adapting to Climate Change*. While this proposed a number of practical steps to realise its vision, education was largely absent. Rather, it focused on providing better information to the public and private sectors. Education was also lacking in the Department of Climate Change and Energy Efficiency's submission on *Barriers to Effective Climate Change Adaptation* in 2013. Overall, references to learning, education and skills tend to be absent in policy documents regarding climate change adaptation. Where reference is made, the emphasis on provision of knowledge alone seems to counter the much broader and competence-oriented principles of education for sustainability as applied in the Australian DESD strategy previously mentioned.

In comparison, the 2011 COAG *National Strategy for Disaster Resilience* offered a more central role for both formal and informal education. It argued that providing information alone was not sufficient, and what was needed was to empower people to act on their knowledge.

20. Education for sustainability is the more widely used term for education for sustainable development in Australia.

Conclusion

Climate change is considered a key component of education for sustainability in Australian education policies. Initiatives in the VET sector clearly demonstrate the importance of education and providing skills to help workers respond to climate change. On the other hand, the role of formal education is largely absent from national policies on sustainability and climate change issues. A contrasting approach is evident in the national disaster resilience strategy, which does emphasize how education and learning can contribute to the more complex process of changing behaviour across the entire community.

Bangladesh

Introduction

With a population of 157 million, Bangladesh is the world's eighth most densely populated country, with 75 per cent of the population living in rural areas. Some 31 per cent of the population lives below the poverty line and only 58 per cent of adults are literate.²¹

Bangladesh is ranked as the most climate-vulnerable country in the world. It is also one of the most disaster-prone countries and experiences regular tropical cyclones, floods, tornadoes and droughts. A cyclone in 1991 destroyed 9,300 schools, and floods in 1998 and 2004 affected 13,718 and 17,853 schools respectively.

Education in Bangladesh is separated into primary, secondary, higher and tertiary levels. Schooling can take the form of general, technical or Madrasa education, with the latter being controlled by the Madrasa Education Board. Primary school education is free and compulsory for all children aged 6 to 10. However, Bangladesh is still struggling to reach global education goals such as universal primary education.

CCE AND ESD in national education and skills development policies

Currently, there is no specific ESD or CCE policy in the Bangladesh education sector. The Ministries of the Environment and Education play key roles in promoting environmental education, which is included in some components of the school curriculum. The focus of environmental education has been broadened to include sustainable development, health education, water resource management and urban and rural development.

A full tertiary-level curriculum has not yet been developed. There are institutes and courses at tertiary level which cover disaster management; however, no course devoted entirely to climate change has been offered so far. Universities were found to include some environmental education in science and engineering-related disciplines such as earth science and biological science.

A *National Education Policy*, approved in 2010, aims to establish a unified schooling system and introduced several compulsory subjects. The policy requires the curriculum for some subjects to emphasize climate change, but the document contains no mention of sustainability or ESD.²²

Several universities in Bangladesh offer courses on disaster management, and the Government of Bangladesh has made it compulsory that two hours of training on disaster management be included in the curricula of all types of training institutes. However, there is no reference to risk reduction or climate change in the syllabus.

The non-governmental organization CARE Bangladesh developed a curriculum on climate change for secondary schools through the Reducing Vulnerability to Climate Change project. This has been integrated into textbooks for science and geography.

Bangladesh's 2005 *National Adaptation Programme of Action (NAPA)* included education-related activities that require climate change issues to be embedded in the curriculum for secondary and tertiary educational institutions. It is unclear how these objectives have been developed and implemented.

CCE in national climate change and sustainable development policies

There was limited evidence that CCE has been integrated into national policies. A *National Capacity Self-Assessment* for implementing the provisions of the *United Nations Framework Convention on Climate Change* and *United Nations Convention to Combat Desertification* resulted in the creation of a *Capacity Development Action Plan*. The plan contained fifteen actions focused on climate change.

The 2008 Bangladesh *Climate Change Strategy and Action Plan* contains six key focus areas with one being 'capacity-building and institutional strengthening'. Bangladesh's second *Poverty Reduction Strategy Paper*

21. UNESCO, 2014.

22. Bangladesh Ministry of Education, 2010.

also includes measures that address caring for the environment and issues of climate change. However, it is not apparent that the plan or strategy paper mentions the use of education or ESD to this end.

The *National Plan for Disaster Management* (2010-2015) was approved in 2010 to address disaster risk reduction. The plan refers to the implementation of a national training strategy aimed at building knowledge and understanding of climate change and disaster management roles and responsibilities.

The *Coastal Zone Policy* (2005) and *Coastal Development Strategy* (2006) integrate issues on climate change adaptation and disaster risk management as does the *National Agriculture Policy* (1999). Other policies in thematic areas of the environment, health, energy, food, land use, forest and fisheries do not specifically address climate change or include ESD.

Conclusion

Bangladesh's wider development challenges should be taken into account when evaluating the extent to which CCE has been included in the education sector or other government policies.

ESD and CCE are new concepts in the Bangladesh education sector and are not currently covered by a specific policy. The school curriculum, however, does include components of environmental education and disaster management.

There is potential to increase CCE and ESD by improving interaction between researchers, teachers, NGOs, public officers and others in the field of education.

Brazil

Introduction

Brazil has a population of just over 200 million and is one of the most biodiverse countries in the world.²³ Brazil's coastal lowlands, mega-cities and environmentally and socio-economically marginal areas are especially at risk from the impacts of climate change. Very high income inequality exists, with acute poverty in rural areas and urban slums.

The Brazilian education system is divided into preschool, basic, intermediate and higher education. Basic education is compulsory for all children aged 6 to 14 and free at all public institutions. Universities provide higher education qualifications and promote extension activities to the community. There has been a notable expansion of the technological institutes sector.

In Brazil, Climate Change Education and education for sustainable development both fall under the term 'environmental education' (EE). Brazil is recognized as an international leader in thought, policy and practice in the field of environmental education.

CCE in national education and skills development policies

The 1988 Brazilian Constitution's guidelines for national education include environmental education as one focus area.

The 1994 National Environmental Education Programme focused on environmental education in the formal education sector, education in environmental management and the delivery of environmental education campaigns for the users of natural resources.²⁴ The Ministry of Education drafted the *National Curriculum Parameters (PCN)* in 1997 and *PCNs in Action: the Environment* in 2001. These aimed to provide national guidelines for school curricula with themes that crossed disciplinary boundaries, such as environment, ethics, cultural diversity, sexual orientation, work and consumption. During the UN Conference on Sustainable Development (Rio+20), the Ministry of Education presented the *National Curriculum Guidelines*

for Environmental Education (2012) that includes CCE and DRR.

In 1999, the *National Environmental Education Policy* (PNEA) was established, requiring that the formal education sector treat environmental education in an interdisciplinary manner, not just as a stand-alone topic. Since then environmental education in Brazil has been the joint responsibility of the Coordination Unit for Environmental Education at the Ministry of Education and an environmental education division of the Ministry of the Environment.

A 2010 review found that the PNEA did not provide guidelines for climate change adaptation. While the practice of environmental education is mainstreamed in the primary education system, there are still limited learning opportunities for teachers, educators and local communities to incorporate more complex themes as these emerge.

The *National Plan on Climate Change* (2008) includes the Sustainable Schools Programme, which calls upon the Ministry of Education to increase the adaptive capacity and climate change resilience of schools. This includes upgrading school and university infrastructure, improving school management, increasing teacher education and introducing climate change into the curricula and learning materials.

At the school level, the children and youth conferences *Let's take care of Brazil* and *Let's take care of the Planet* involve millions of people debating CCE and sustainability in schools all over the country.

Environmental education is also present in higher education. Several initiatives promote undergraduate and graduate programmes whose syllabi cover the need to lower carbon emissions, the protection of communities and DRR. While acknowledged as important, green jobs and green skills are not a focus area within TVET in Brazil.

A new *Education Development Plan* for the 2011-2020 decade has established ten directives for education that include promoting social and environmental sustainability. However, the plan does not explicitly mention EE, ESD or CCE among its objectives, actions and goals.

23. UNEP, 2012.

24. MIT, 2002.

CCE in national climate change and sustainable development policies

Brazil has adopted strong climate change legislation. The *National Policy on Climate Change* (2009) established a voluntary emission reduction target. The *National Policy for Protection and Civil Defence* (2012), and the *National Policy on Solid Waste Residue and Climate Change* (2010) included an education component. However, this legislation does not allocate a central role for education.

The Ministry of Science, Technology and Innovation created a Centre for Natural Disaster Monitoring and Alerts (CEMADEN) in 2012 and launched an informal CCE project called *Pluviometers in the Community*. This project allows communities to contact local authorities and receive guidance in order to take immediate action in dangerous situations. More recently, CEMADEN has been implementing a pilot project for high schools that includes science education and research, DRR, CCE and sustainability.

There are a number of other ongoing ESD and CCE-related initiatives such as the Brazilian National Forum on Climate Change and the National Institute of Science and Technology for Climate Change, but there is limited coordination between them. Overall, climate change has been a marginal feature of environmental politics when compared to more visible local environmental challenges such as deforestation, waste policies and water.

Conclusion

The Brazilian Constitution, *National Policy on the Environment* and *National EE Policy* provide the foundations for institutionalizing environmental education in Brazil. However, while environmental education policies and programmes are in place, they still have a limited impact on mainstream Brazilian education, environmental and climate change policies.

Moreover, CCE is limited. Schools-based environmental education policies do not reach all schools, since engagement is voluntary and dependent on state, municipal and schools' political will.

Initial and continuing in-service CCE training for teachers would be the way forward.

Chile

Introduction

Chile has a population of just under 18 million. Its indicators for quality of life, economic growth, human development and per capita gross domestic product are among the highest of all Latin American countries. Due to its low altitude coastal areas, arid, semi-arid and forest regions, Chile is vulnerable to the impact of climate change, especially droughts and desertification.²⁵

Education in Chile is divided into preschool, primary school, secondary school, TVET and higher education. Attendance at primary and secondary school is mandatory for all children of school age.²⁶ The Ministry of Education is responsible for preschool, primary and secondary schooling. The Ministry of Environment is responsible for the design and implementation of environmental policies, plans, and programmes that have some overlap with the education sector in regards to CCE.

CCE in national education and skills development policies

Two major documents outline CCE in Chile's education sector; the *National Policy on Education for Sustainable Development* and the *National Education and Awareness Plan on Climate Change* (2008–2012).²⁷

The *National Policy on Education for Sustainable Development* promotes ESD nationwide and considers education as a fundamental tool for achieving sustainable development. The policy covers increasing teachers' pedagogical skills and ESD knowledge, and lifelong learning for civil society in the non-formal education sector as a means to create a sustainable society. The multi-sectoral action plan for the policy was approved in 2013.²⁸

The *National Action Plan on Climate Change* included a capacity-building component, consisting of the *National*

Education and Awareness Plan on Climate Change, which was applicable to all levels of education. It covered climate change background information, conceptual elements, country-level commitments, general guidelines and actions. However, it gives no targets or deadlines, and no officials have been tasked to lead the implementation. The plan also included components related to embedding climate change into school curricula and increasing teachers' knowledge about climate change. While some progress has been made on embedding CCE into the curriculum of the formal education sector, Climate Change Education is not yet explicitly included in primary school. More success has been achieved with disaster risk reduction, which was incorporated into the formal education sector during a 2012 curriculum review.²⁹

Environmental education issues are barely addressed in higher education and there are no guidelines in place to help reinforce the capacity of higher education teachers in ESD or CCE. Despite shortfalls, there are a number of promising initiatives to create 'sustainable campuses' involving several universities. There are no plans or strategies targeting TVET or green jobs, a gap that could potentially be targeted.

CCE in national climate change and sustainable development policies

In 1996, Chile ratified the *United Nations Framework Convention on Climate Change*, which led to the establishment of the National Advisory Committee on Global Change. In 2006, the *National Strategy on Climate Change* was approved, covering climate change adaptation, mitigation of greenhouse gas emissions and capacity-building on climate change. The strategy led to the development of the *National Action Plan on Climate Change (2008-2012)*.

Other current activities that provide opportunities for CCE include a *Low Carbon Strategy* created by the Climate Change Division of the Ministry of Environment, and a study focused on identifying and developing a green growth strategy.

25. Chile: Ministerio del Medio Ambiente, 2011.

26. Right to Education Project, 2008.

27. In 2013 after this study was finalized, the Ministry of Education published a set of guidelines and orientations for educational institutions from pre-primary to secondary level on how to adopt a 'whole-of-school approach' to ESD, including Climate Change Education. The guidelines contain innovative and comprehensive material, however it is too early to evaluate their impact.

28. See: http://www.mma.gob.cl/educacionambiental/1319/articles-55540_recurso_3.pdf

29. ONEMI, 2012.

Conclusion

Chile has made important progress by adopting two key CCE policies and strategies in the formal and non-formal education sector. These aim to enhance teachers' ESD competencies, to embed CCE into the formal school curriculum and to raise awareness among citizens through non-formal education. While these plans demonstrate progress, they have not been binding or supported with sufficient human and financial resources. The country possesses a *National Plan for Education and Awareness on Climate Change*, while measurable targets are still to be developed. The fact that not only the Ministry of Environment and the Ministry of Education but also other sectors commit to ESD seems promising.

China

Introduction

With a population of 1.39 billion, the People's Republic of China (China) is the world's most populous country and the third largest by area.

China's National Development and Reform Commission (NDRC) is responsible for studying, developing and setting policies related to economic and social development, including the Five-Year Plans, as well as the coordination and regulation of areas related to sustainable development.

China's economy has grown quickly since reform in 1978, with an average annual growth rate of over 10 per cent between 1980 and 2010. The rapid industrialisation and urbanisation process has resulted in environmental pressures, as well as challenges to sustainable development. While China is not the world's largest emitter of greenhouse gases in absolute terms, it accounts for nearly 22 per cent of total global emissions. Its per capita emissions have increased by nearly 200 per cent between 1990 and 2007 and are now above the global average.

China has 9 years of compulsory education, which operates in 90 per cent of populated areas. There is a vast post-secondary education system, including higher education, vocational education and training (VET), and adult education.

CCE in national education and skills development policies

China introduced environmental education in the late 1970's as a result of increased attention to sustainable development and the need to protect the environment. Following the United Nations Conference on Environment and Development (Rio de Janeiro, 1992), environmental education moved towards environment, population and development, and finally education for sustainable development.

The Chinese government has produced a number of policy documents identifying environmental education and ESD as key to quality education. In 2003, the Ministry of Education issued the first guiding policy - *the Guidelines for Implementing Environmental Education in Elementary and Secondary School* - on environmental

education in China. ESD was formally incorporated into the national education policy in 2010 in *The National Education Outline 2010-2020*, and further integrated in some local education policies.

National climate change policies and plans in China refer to education but do not specifically address CCE. This has resulted in limited institutional support to date. There is no national ESD or CCE action plan or official policy to inform its implementation.

In China, ESD mainly refers to providing individuals with the scientific knowledge, learning capacity, values and lifestyle choices to meet the country's sustainable development objectives. CCE is most commonly implemented as a component of ESD. A number of educational approaches have been adopted to facilitate the implementation of ESD. These include integrating ESD values into school philosophy, curriculum development, capacity-building of teachers and educators, ESD pedagogical approaches and ESD and CCE thematic activities.

ESD is a component of compulsory education, but is limited in higher education, VET and adult education. The Ministry of Education has recently issued a guidance document that identified the VET sector in particular as needing to be reformed to meet the sustainable development objectives of the Chinese economy.

CCE in national climate change and sustainable development policies

China's *Agenda 21: White Paper on China's Population, Environment and Development in the 21st Century* issued in 1994 reconfirmed that sustainable development was a top priority of China's development and reform agenda. In 1996, 'sustainable development' and 'revitalising the nation through science and education' were adopted as major national strategies. Subsequent Five-Year Plans have highlighted sustainable development and education as key drivers of change. The 11th (2006-2010) and 12th (2011-2015) Five-Year Plans included specific references to energy efficiency and climate change. ESD and CCE focus on the sustainable development of the economy and society.

Until the late 1980s, there was little history of research or national policy on climate change and therefore no domestic capacity for assessing the potential dangers it may pose. The National Leading Committee on Climate Change was established in 2007. That same year, the National Climate Change Programme was launched, which outlined the principles and objectives, key areas of actions, as well as policies and measures for climate change adaptation and mitigation. This made China the first developing country with a national climate change mitigation programme.

China's climate change policies and initiatives identify education as a key component of raising the population's awareness on climate change, and as a means to change behaviours in the direction of sustainable development. The recent development of CCE-related activities has been driven mainly by government's climate change policies and initiatives, rather than educational policies. CCE is mainly implemented as a part of ESD.

Conclusion

China's climate change policies and initiatives have driven CCE-related activities to date. Education is identified as a key contributor to the behavioural changes required achieving sustainable development objectives. The past two Five-Year Plans specifically recognise the importance of addressing energy efficiency and climate change.

China's national education policies in relation to ESD and CCE are largely coherent. However, a lack of action plans and other barriers mean that there is a gap between the policies and their implementation. National action plans to address ESD and CCE are the way forward to support the implementation of the education policies.

While a top-down approach has been favoured in dealing with sustainable development and climate change issues, China's ESD and CCE-related initiatives have also attempted to engage schools, communities, universities, research centres, enterprises, NGOs, government and other organizations to promote ESD collaboratively.

Costa Rica

Introduction

Costa Rica has a population of 4.9 million and has a history of stability in social and economic development. As a middle-income country, its poverty rate stands at around 3.1 per cent. The country's main industries are tourism and agriculture, and it is ranked highly for ecotourism thanks to its rich biodiversity and landscapes.

Costa Rica suffered serious forest and biodiversity losses during the 1960s. Since the 1970s, it has reformed its legal and institutional framework to curb deforestation for agricultural development. As a result, Costa Rica now prioritizes natural resource conservation and incorporates sustainable development in its overall development policy.

CCE in national education and skills development policies

Costa Rica is considered one of Latin America's leading countries in environmental education. Since the 1980s, a national development strategy has promoted ecotourism, environmental conservation and environmental education. Costa Rica adopted several national policies related to environmental conservation and management in the 1990s. The Ministry of Environment, Energy (and later, Telecommunications; MINAET) was established in 1995. Environmental education first appeared in national policy in 1995 in the *National Organic Environmental Act*. The aim of the law was for citizens to adopt an environmental culture that facilitated sustainable development. Following this, the MINAET developed a series of policy-based instruments for the law's effective implementation. An Office of Environmental Education of MINAET was established in 1998.

The Ministry of Public Education has also developed initiatives in environmental education in coordination with MINAET. This included the establishment of an Office of Management of Environmental Education for Sustainable Development. Environmental education was formally incorporated as a main component of the school curriculum in 2000.

Costa Rica's *National Commitment on the Decade of Education for Sustainable Development* in 2006 noted that education was necessary to drive the cultural change required

for sustainable development. The commitment sought to incorporate environmental education into trans-disciplinary subjects such as poverty reduction and gender equity. Environmental education is included in the curriculum as a cross-cutting 'value', and is taught throughout primary and secondary grades.

The Inter-University Environmental Education Commission was established in the mid-1990s. This has led to climate change coursework being added to university subjects in accordance with the carbon neutral (*C-Neutral*) 2021 policy. There have been fewer activities on ESD and CCE in TVET, though recently 'green' courses have been developed.

Since 2003, the Ministry of Public Education instigated a seven-day teacher training programme related to environmental conservation and sustainable development. This initiative seeks to provide hands-on knowledge to teachers so that they can incorporate environmental issues into their teaching. Climate change coursework was added in 2007.

CCE in national climate change and sustainable development policies

Several studies were carried out during the 2000s to estimate the impact of climate change, especially in terms of a perceived increasing vulnerability to natural hazards, including more frequent extreme rainfall and droughts. As a result, the government approved several policy instruments to mitigate and adapt to climate change impacts. These include, in addition to the national commitment on the DESD, a policy initiative entitled *Peace with Nature Initiative* (2006) and the *National Strategy on Climate Change* (2009). The former included the target of a c-neutral country by 2021 by encouraging behavioural changes, promoting forest plantation and developing an eco-labelling scheme (*C-Neutral Made in Costa Rica*). However, no strategy or action plan has yet been implemented on ESD and CCE to achieve the *C-Neutral 2021* policy target.

The most recent comprehensive national policy instrument on climate change, the *National Strategy on Climate Change*, aims to clarify how to achieve the *C-Neutral 2021* policy. Capacity-building and public awareness, education and cultural change are the

main components of the strategy's national agenda that address ESD and CCE. MINAET leads the implementation of the climate change strategy; the National Direction of Climate Change, which was established in 2009 under its responsibility, coordinates implementation among multiple stakeholders, including different council of government ministries and agencies. The Ministry of Public Education is involved through the sector council and looks after areas related to ESD and CCE.

The Ecological Blue Flag Programme, begun in 1996, sought to establish incentives for natural resource conservation by coastal communities. The Ecological Blue Flag Programme for Schools is a related extracurricular activity to encourage public schools to help improve environmental quality within their local community.

Conclusion

Costa Rica has taken a wide range of initiatives to support ESD and CCE within the education sector and as part of its national climate change policy. It has benefited from a long-standing acceptance of sustainable development and environmental conservation. The country's aim to become the first carbon neutral country, encapsulated in the *C-Neutral 2021* policy, provides a foundation for ESD and CCE activities.

However, Costa Rica faces a number of challenges for the effective implementation of ESD.

ESD and CCE could be strengthened through policy guidelines and an inter-institutional coordination mechanism. There is room to incorporate community knowledge into ESD and CCE through a participatory, bottom-up approach.

Denmark

Introduction

With its population of 5.6 million, Denmark ranks among the world's highest in material consumption and per capita emissions.

At the same time, Denmark is currently the country with the most efficient policies to reduce greenhouse gas emissions and prevent climate change in the world, according to the *United Nations Climate Change Performance Index 2013*³⁰.

Danish nature is being already affected by climate change. This may be expected to continue in step with changing climatic patterns. Climate change will affect Danish natural habitats and the species composition of plants and animals. Rising water levels and more precipitation could cause flooding and other impacts on coastal habitats, for example.

CCE in national education and skills development policies

Denmark and its neighbouring countries began working together in the 1990s to formulate a policy for ESD. While Denmark signed the United Nations Economic Commission for Europe (UNECE) declaration on ESD in 2005, it did not adopt a strategy until 2009, just before the half-way point of the DESD. The Ministry of Education, which was made responsible for the DESD, organised a consultation process on how to promote ESD before adopting its strategy in 2009.

The UN Climate Summit (COP15) held in Denmark in December 2009 provided the impetus to develop of a number of national ESD policy initiatives. A national strategy on ESD was developed with a substantial climate change component. The aim of the strategy is to make citizens more responsible for their actions by improving their scientific knowledge. The ESD strategy notes that climate change should not be the sole focus of ESD, though the concrete initiatives that are part of the strategy mostly support the CCE projects and activities that were part of COP15 preparations.

A new national school curriculum adopted in 2009 included elements of ESD and CCE. The concept of sustainability was embedded in the goals describing the interrelationships between nature and society. CCE is mostly approached as teaching climate science, but it was also included in subjects such as geography and social studies, where the interrelationships between human behaviour, consumption and climate are examined.

There has been no explicit policy change in the TVET sector to upgrade skills to respond to climate change and environmental issues. However, it is important to note that the Danish TVET sector had previously reflected skills related to ecological modernisation in areas such as energy generation, waste management and agriculture.

While the new government identified the economic and environmental climate change crises as important, education is only referred to in relation to the economic crisis. There is no mention of climate change or sustainability with regard to education, and the platform documentation on 'green transition' does not mention education. Overall, no policy strategy has been set to promote ESD, CCE, or the 'greening' of TVET as part of the government's sustainable development and climate change policies.

Government initiatives support NGO-led projects to raise community awareness of climate change. A national network on ESD was established with funding through to 2013.

CCE in national climate change and sustainable development policies

Ecological modernization through the application of innovative technologies and practices such as wind turbines, water treatment plants and organic farming, has been the dominant approach to sustainable development since the 1990s in Denmark. Most sectors have experienced a 'greening' over the past thirty years.

30. <http://germanwatch.org/en/download/7158.pdf>

Education is mentioned in some government documents on sustainable development and climate change. These include community education about disaster preparedness and response related to climate change, as well as a government subsidy scheme for education related to transitioning towards a green economy. However, these approaches do not form part of an integrated strategy, and they focus more on providing information, as opposed to the behavioural change that is the objective of CCE.

Conclusion

CCE could play a more prominent role in Denmark's sustainable development and climate change policy, as well as its current education and skills development strategy. Where education is part of policy, it is mostly expressed in terms of public information rather than an ESD approach. The ESD strategy approached ESD from a scientific basis, and this has remained quasi-unchanged with the current government.

Dominican Republic

(See also the case study in this Report)

Introduction

The Dominican Republic is a small developing island nation in the Caribbean bordering on Haiti and with a population of just over 10 million.

The country has abundant natural wealth and its economy is one of the largest within the Caribbean and Central America. The national gross domestic product is expected to more than double by 2030. Despite this economic growth, there is a wide gap in income distribution with high levels of poverty.

The Dominican Republic is highly vulnerable to the impacts of climate change, such as the increasing frequency and intensity of storms, severe hurricanes, sea level rise and coastal erosion, health impacts and biodiversity loss.

The Dominican education system is divided into initial, primary, and secondary education, higher education and technical and vocational training. The Ministry of Education (MINERD) and the Ministry of Higher Education, Science and Technology (MESCyT) are in charge of education policies. The country has doubled its investment in education for the period of 2012-2016 by allocating 4 per cent of GDP to education.

CCE in national education and skills development policies

The Dominican Republic has taken a lead role in promoting ESD. Environmental education was made mandatory for all schools in 1998 and this has since evolved into ESD. In 2000, the *General Law of Environment and Natural Resources* changed the way environmental education was taught, moving from a subject matter to a cross-cutting and interdisciplinary theme. Risk management is also an important aspect of MINERD's strategic plan, and has been integrated into the school curriculum as a cross-cutting subject. In 2004, the *Environmental Education Strategy for Sustainable Development* was adopted, which fosters formal and non-formal ESD. It is based on constructivism and

uses a variety of pedagogical techniques that promote participatory learning.³¹

The *Ten-year 2008-2018 Education Plan* (PDE) addresses the issue of quality education, including sustainable development and a culture of peace. It also established a process for periodic review of the curriculum. Climate change is also being introduced into the curriculum. The National Teacher Training Institute (INAFOCAM) and the Salomé Ureña Higher Institute for Teacher Training (ISFODOSU) provide support for environmental education through teacher training and curriculum support. The *Ten-year 2008-2018 Higher Education Plan* (PDES) includes environmental issues in the curricula and establishes a research programme to promote sustainable development.

The Dominican Republic has been involved in a number of ESD and CCE initiatives that have helped build local capacity, including:

- formal, non-formal and informal projects on ESD led by governmental agencies, civil society organizations, young leaders and local communities;
- UN: CC Learn Project, which supports the design and implementation of results-oriented and sustainable learning to address climate change (see the detailed case study in this Report);
- *National Strategy to Strengthen Human Resource Capacities to Advance Green, Low Emission and Climate Resilient Development* (ENDVBERC);
- teacher training supported by the UN: CC Learn-UNITAR, and the UNESCO-CCESD pilot programme.

CCE in national climate change and sustainable development policies

In the past few years, the Dominican Republic has been at the forefront of establishing legal and institutional instruments for education and climate change.

31. Constructivist teaching and learning is based on the belief that learning occurs as learners are actively involved in a process of meaning and knowledge construction, as opposed to passively receiving information. Learning always builds upon knowledge that a student has already acquired, and learners are the makers of meaning and knowledge. Constructivist teaching fosters critical thinking, and aims to create motivated and independent learners.

The 2010 National Constitution included ESD within the guidelines to progress sustainable development and environmental protection. Climate change adaptation was also addressed in the Constitution for the first time. There has been a government-wide approach to sustainable development as articulated in the *2010-2030 National Development Strategy* (END). END incorporates sustainability as a cross-cutting concept and all public policies must include criteria for environmental sustainability and an appropriate, comprehensive risk management component.

The Dominican Republic has adopted a number of legal and institutional instruments to address climate change since 2008, all of which refer to education and capacity-building:

- the National Council for Climate Change and Clean Development Mechanism (CNCCMDL) was established in 2008 as a multi-sector and multi-stakeholder coordination platform;
- the *National Adaptation Action Plan* (PANA) was developed in 2008;
- agreement was reached on a 2011–2030 *Strategic Climate Change Plan* (PECC);
- the *Plan for Economic Development that is Compatible with Climate Change* (DECC) was launched in 2011. It aims to double GDP by 2030, while at the same time cutting CO₂ emissions by half.

Conclusion

CCE has gained momentum in the Dominican Republic with the inclusion of climate change in the Constitution. Climate change is approached from a systemic, multi-sectorial, inter-institutional perspective. Importantly, education and climate change policies revolve around the common principle of participation, which contributes to the strengthening of democracy and governance.

The country does face some challenges in embedding CCE: for the moment each area of education – ESD, DRR, CCE – still has its own separate work plan. National and international resources need to be mobilised for the implementation of the ENDVBERC strategy and ESD and CCE projects. Despite these challenges, the Dominican Republic is well placed to achieve its CCE objectives. High-level political support, along with a whole-of-government approach to sustainable development and climate change that recognises the critical role of education and capacity-building, provides a strong foundation to mainstream CCE.

England (United Kingdom)

Introduction

England is one of four constituent countries – England, Scotland, Wales and Northern Ireland – which make up the United Kingdom of Great Britain and Northern Ireland (UK). The population of the UK is just over 63 million.

Scotland, Wales and Northern Ireland have devolved administrations and separate educational systems, which leads to variations in curriculum and assessment structures. By contrast, there is no devolved government in England. It has compulsory education at primary and secondary levels between the ages of five and sixteen.

CCE in national education and skills development policies

Environmental and development education have been present in England since the 1970s, when civil society organizations took the lead. From the late 1990s, the UK government promoted sustainable development and ESD at the local, regional and national levels. However, while a number of strategic government reports addressed CCE, government policy has focused less on ESD since 2010.

The 2008 report *Brighter Futures – Greener Lives: Sustainable Development Action Plan 2008-2010* outlined a number of specific initiatives related to Climate Change Education using an ESD approach. This included empowering youth with the skills, knowledge and freedom to voice their opinions and make a difference. The same year, CCE was introduced into the Key Stage Three (11 to 14 year-olds) geography curriculum.

The report *Education for Sustainable Development in the UK 2010* noted that there were signs of substantial progress in embedding ESD-related policies and developing practices in the UK across a wide range of sectors in 2008 and 2009. For example, documents in 2009 highlighted the ‘Sustainable Schools’ project that aims to empower youth to cope with the future challenges facing the planet. The aim is for all schools to be ‘Sustainable Schools’ by 2020.

Following the change of government in 2010, the focus on ESD has been replaced by CCE as part of an overall strategy towards a low carbon society. CCE is addressed in a number of strategic reports produced by the government departments responsible for education as well as climate change. This seems to have shifted the educational approach more towards science, technology, engineering, mathematics, innovation and management competencies.

The UK Department of Business, Innovation and Skills report, *Skills for Sustainable Growth*, published in 2010, also indicates a shift in policy. In this document, sustainable growth is related to economic growth, with the environment mentioned as a value. This suggests that growth became a more important guiding principle than sustainability. Moreover, the above-mentioned CCE geography curriculum from 2008 has been removed from the Department of Education’s consultative guideline, together with references to sustainable development. Chemistry is therefore the only remaining subject that addresses climate change.

It should be noted that curricula in areas like teacher education and higher education are developed by the institutions themselves and not by the national government. For this reason the development of CCE in these areas is not covered by this study.

CCE in national climate change and sustainable development policies

The UK’s main environmental priority is responding to climate change through reducing greenhouse gas emissions from key polluting sectors and adapting to the impacts of global warming.

The *Climate Change Act 2008* was followed by *The UK Low Carbon Transition Plan - National Strategy for Climate and Energy* (2009). The coalition government that came to power in 2010 continued to strengthen the focus on climate change and the green economy, technical and vocational education and green skills. The *Low Carbon Transition Plan* requested every sector of society to act to reduce CO₂ emissions. It also outlined how education institutions should approach climate change via technical carbon management strategies.

In 2010, the Department of Energy and Climate Change published *Meeting the Low Carbon Skills Challenge – a Government Response*. This saw Climate Change Education as providing the workforce with the necessary skills to benefit from the economic opportunities available by the transition to a low carbon and resource efficient world.

Conclusion

Prior to 2009, there was a strong emphasis on ESD and empowering youth in the UK. However, since 2009, the focus has shifted away from ESD towards Climate Change Education and specifically towards acquiring the necessary skills to transition to a low carbon economy. This is reflected in the UK government's *Low Carbon Transition Plan*. As a result, the departments responsible for education and skills, as well as for energy and climate change, are now working together to develop plans on skills for sustainable growth.

India

Introduction

With a population of 1.25 billion, India is the world's third largest economy as measured by purchasing power parity. It has undergone significant social, economic and developmental transformations, especially over the past twenty years. In 1991, India adopted liberal and free-market principles into its economy, which have had a considerable impact on the country's environment.

India sees education as key to its development and to overcoming inequalities based on caste or gender. According to the Indian Constitution, both the central and state governments manage education, which is free and compulsory for all children from the age of 6 to 14 years. Higher secondary schools and polytechnics provide vocational education and training.

CCE in national education and skills development policies

Protection of the environment and cultural heritage is enshrined in the Indian constitution. The impetus to integrate environmental education into the formal education system came from the 1972 Stockholm Conference. The 1986 *National Policy on Education* further emphasised environmental education. The Supreme Court of India made environmental education compulsory in 1991 and issued a new directive in 2003 highlighting the need for it to be mainstreamed.

The 2005 *National Curriculum Framework* was a landmark policy as it sought to reorient education and make it more relevant to students' lives. It situated the teaching-learning process in a social, cultural and global context, which reflects education for sustainable development (ESD) concepts. While the *Framework* does not explicitly mention CCE or ESD, it strongly recommends the integration of environmental issues and concerns in every subject and emphasises project-based learning to expose students to the natural and social environments in which they live.

While the government and especially civil society organizations promote environmental education, India is yet to completely transition from EE to ESD. Communities and civil society organizations are successfully carrying out several grassroots ESD initiatives in different parts of the country. However, in general, there is little awareness of ESD as a method and pedagogy and of the Decade of Education for Sustainable Development. Similarly, climate change education is reflected in the curriculum on environmental education and ESD, but is not widely known as a conceptual framework.

There are a number of institutional structures that support education and environmental education in India. The central Ministry of Human Resource Development (MHRD) is responsible for educational policy planning. The National Council of Education Research and Training (NCERT) is responsible for formulating the *National Framework Curriculum*, including the integration of environmental education into the syllabus. NCERT also functions as a resource centre in the field of school development and teacher education.

In 1985, the Indian Government established the Ministry of Environment and Forests (MoEF), which was tasked with implementing environmental programmes. Environmental education was restricted to the MoEF for many years, but the government recognized the need to integrate environmental concerns into all aspects of education. As a result, the government gave the MHRD the principal responsibility of implementing environmental education through the formal educational system, while the MoEF is responsible for environmental education in non-formal education. However, there seems to be little coordination between the different ministries on issues of sustainable development and climate change.

Concerning skills development, Indian students mostly chose mainstream courses like science, commerce or social sciences over vocational education, which is not highly reputed. Though the concept of 'green jobs' is not widely known, there are several traditional jobs and trades in India that can be classified as such. However, the country does not have a national green skills strategy to identify or generate such jobs, even though this would also help combat high unemployment rates.

CCE in national climate change and sustainable development policies

India has only recently adopted a systems approach which recognizes the links between society, economy and the environment, and moves the country's efforts from the narrow sphere of 'environmental protection' to the holistic framework of sustainable development. The 2006 *National Environment Policy* (NEP) captures the spirit of sustainable development and reflects the global discourse on sustainable development and climate change. The NEP looks at sustainable development as something that enhances human well-being, a recurring theme in India's development philosophy. The *Policy* makes a strong case for environmental education, emphasising the need for environmental awareness and education to lead to the desired behavioural change in both public and private domains.

The concept of sustainable development is also reflected in the government's recent Five-Year Plans (FYP). For example, the 11th Five-Year Plan, announced in 2007, identified sustainable development as an important developmental goal. The 12th and current FYP further strengthens the sustainability agenda with a vision for more inclusive and sustainable growth. However, education is only mentioned in terms of access and enrolment in science and technology. Without mentioning Climate Change Education, the 12th FYP calls for the development of India's national capacity in climate change science in collaboration with a cross section of scientists and research and development (R&D) professionals.

Climate change, and India's response, remains a debated topic. Though total greenhouse gas emissions are high, the per capita emission is very low compared to the world average. India's *National Action Plan on Climate Change* is focussed on mitigation strategies to achieve both developmental and climate change outcomes, rather than prioritizing climate change.

Conclusion

There is limited reach and acceptance of ESD as a conceptual and pedagogical framework in India, as major stakeholders, especially educators, practitioners and even policy makers, are not aware of the prevailing global discourse on ESD. There is lack of policy coherence on sustainable development, climate change and environmental education, and very little concerted effort has been made to find points where these three issues might intersect.

Education in India is largely considered to be a 'developmental' goal and education policies are concentrated on improving enrolment rates and equal access. ESD plays a critical role as it embraces both ensuring access to basic quality education and reorienting education for a sustainable future, and equips people with the skills and knowledge to adapt to rapidly changing economic, social and ecological environments.

Indonesia

Introduction

The Republic of Indonesia is an archipelagic state extending over 3.1 million square kilometres of sea and approximately 2 million square kilometres of land area. A high percentage of its population of 250 million live in low-lying coastal areas, therefore, vulnerable to climate change impacts, such as rising sealevels.

The Indonesian education system is divided into basic (primary and junior school), secondary (senior secondary school and vocational secondary school) and higher education. Ministry of National Education (MoNE) manages general schools in the formal education sector, and the Ministry of Religious Affairs (MoRA) manages Islamic schools. The education system under MoNE is decentralized and a degree of responsibility in providing public education now rests with district governments. MoRA has maintained oversight of public Islamic schools.

CCE in national education and skills development policies

While not explicitly stated, ESD and CCE can be implicitly found in two national policies, namely the *Indonesian National Long-Term Development Plan (2005-2025)* which includes a focus on sustainable development, and the *Mid-Term Development Plan (2010-2014)*. The *2010-2014 MoNE Strategic Plan* sets out policy for educational development using ESD principles. All units of the MoNE are expected to implement the national policies in relation to ESD.

ESD implementation is facilitated by a *Joint Decree (2010 memorandum) on Environmental Education* between the Ministry of Environment (MoE) and the MoNE. The *Decree* aims to improve environmental understanding among communities and to address environmental and conservation issues. However, the focus is on environmental education and broader ESD concepts have not yet been integrated.

The Centre of Policy Research and Educational Innovation has worked on an ESD research development framework. The school curriculum does not, however, explicitly incorporate ESD programmes into learning. Instead, the ESD values have been

implicitly included in the *Standard Competence/Basic Competence* in almost all subjects.

Indonesia's *National Action Plan Addressing Climate Change (2007)* indirectly mentions education as one of several focus areas. Both the Department of National Education and local governments have been tasked with introducing the subject of 'energy saving' into the education curriculum. The MoE has also initiated ESD projects involving schools and NGOs. However, there is a lack of coordination and the MoNE is often unaware of these projects.

Several teacher training institutes have developed modules to increase teachers' knowledge about ESD. However, ESD has not been explicitly integrated into the teaching and learning process in the classroom and there are no teacher education institutes incorporating ESD into their curricula.

CCE in national climate change and sustainable development policies

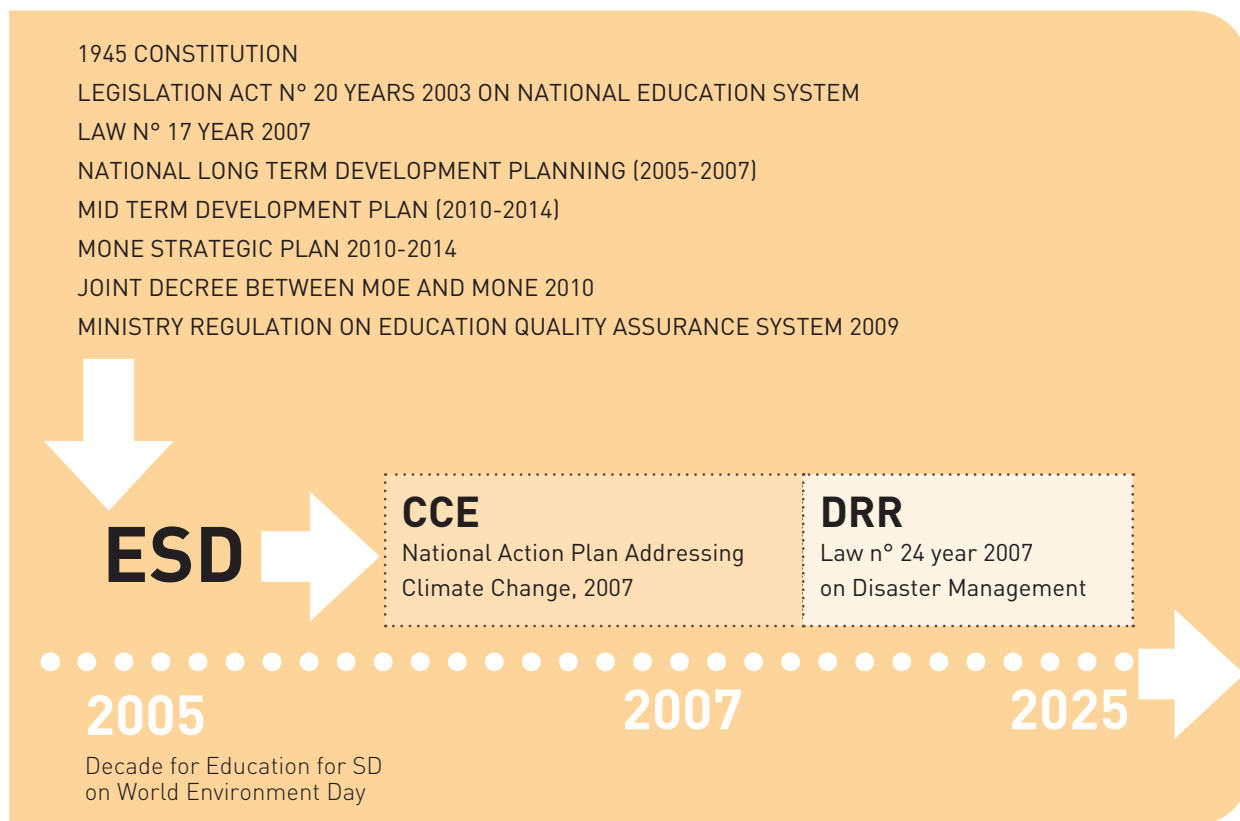
A number of Indonesian laws, planning instruments and regulations support the development of green jobs. A green economy programme linked to the sustainable development plan (*Indonesia Long-term Development Plan 2005-2025*) was launched by the Second United Indonesia Cabinet to develop green jobs and green skills. A *National Strategy to Strengthen Human Resources Capacities and Skills to Advance Green, Low Emissions and Climate Resilient Development* was launched in 2013.

Disaster risk reduction (DRR) is encapsulated in the 2007 *Law No. 24 on Disaster Management*. A *National Strategy for Disaster Risk Reduction Mainstreaming in the School System* was later launched by MoNE. The *National Strategy* included key elements dealing with the empowerment of educational institutions and stakeholders and the integration of DRR into formal and extra curricular learning.³² Indonesia hosted a Climate Change Education Forum and Expo in April 2012 and the outcomes of this forum are to be fed into the development of the *National Strategy on Climate Change*.

32. UNESCO and UNICEF, 2012.

Figure 2 summarizes the key laws and policies comprising ESD, CCE, and DRR in Indonesia.

Figure 2. ESD, CCE, and DRR legal instruments in Indonesia



Conclusion

Several national policies in Indonesia refer indirectly to CCE and ESD. However, there is no apparent overarching CCE strategy that explicitly focuses on CCE or ESD. The MoNE has the mandate to implement ESD and CCE programmes, and should further integrate the teaching and learning process into formal education. There was also limited evidence of CCE being considered in broader non-education policy, outside of those plans and laws focused on CCE and DRR.

Manitoba (Canada)

Introduction

Canada is the world's second largest country, with 80 per cent of its population of just over 35 million concentrated in urban centres.

Canada is a federal state consisting of ten provinces and three territories. A number of domains including education, are under provincial control, which results in variations across different provincial education systems. School is compulsory for children until the age of 16, but three provinces stipulate education until 18 or the completion of an upper secondary qualification.

Though there is no federal department of education and no integrated national education system, the Council of Ministers of Education, Canada (CMEC) provides some coordination between provincial and territorial departments of education.

CCE in national education and skills development policies

CMEC's 2008 *Learn Canada 2020* provides a framework and vision to enhance Canada's education system and educational outcomes through quality lifelong learning for all. ESD has been identified as one of the key priority areas, aimed at raising students' awareness and encouraging them to become actively engaged in working for a sustainable society. CMEC published *Background – Developing a Pan-Canadian ESD Framework for Collaboration and Action* in 2010. However, the *ESD Framework for Collaboration and Action* that was supposed to follow has yet to be developed. CCE tends to be seen as a major sub-theme of ESD rather than a separate topic. There is no specific approach to CCE at a national level.

At a provincial level, Manitoba has been at the forefront of sustainable development in Canada, and is therefore used as an exemplar. Following *The Sustainable Development Act* in 1998, a Sustainable Development Coordinator was established to support leadership toward enhancing a culture of ESD in schools and post-secondary institutions. The Ministry of Education and Advanced Learning declared ESD a top priority in 2004, and developed an *Education for Sustainability Action Plan (2004-2008)* for primary and secondary schooling. Manitoba established an ESD Working Group in 2005, which has been replicated across most jurisdictions. It also

established an ESD Leadership Council in 2012 to assist in the implementation of a new ESD Action Plan (2013-2016), which is intended to guide a whole-system approach toward implementing ESD in elementary and secondary schools.

TomorrowNow - Manitoba's Green Plan is a 'strategy of strategies' intended to guide the activities of the provincial government into 2020, and encourage all Manitobans to play a role in reducing their ecological footprint and contribute to the green economy. The *Green Plan* underscores the important role that education plays in ensuring that Manitobans learn to live sustainably. For example, Manitoba's *Clean Energy Strategy*, an item included in *TomorrowNow*, brings high visibility to green schools and education for sustainable development. Here, interdepartmental cooperation across *Manitoba's Green Plan* and its *Clean Energy Strategy* can be seen: the *Green Plan* advocates a move towards a whole-school approach while the *Clean Energy Strategy* highlights the importance of whole-school operations.

Manitoba's Green Plan also identifies education as crucial for instilling green skills, knowledge and values within the workforce. The government has recently announced the province's first *Green Economy and Green Jobs Action Plan*, also included in *Tomorrow Now*. The goal is to develop conditions that will enable environmental protection, build climate resilience, ensure sustained green economic prosperity, support social progress and create green jobs for Manitobans. Education, and TVET in particular, will play key roles in promoting this agenda. Manitoba Advanced Education and Training has begun to explore existing school policy, teaching and management practices within TVET regarding sustainable development, and has produced a report on *Technical-Vocational Education for Sustainable Development in Manitoba* (2012).

CCE in national climate change and sustainable development policies

In 2010, the Canadian Ministry for the Environment published *Planning for a Sustainable Future: A Federal Sustainable Development Strategy for Canada*. This strategy is to be updated every three years, identifying achievements as well as areas requiring more work. The strategy places the federal government's environmental

priorities within the broader context of social and economic priorities. Education, however, does not play a significant role in this strategy, probably because education policy is normally set at the provincial level. On the other hand, investment in skills and education does feature under ‘building jobs and industries’, an explicit reference to education as an instrument for economic growth. In 2007, Canadian premiers committed to including climate change in all school curricula. The Council of the Federation published *Canada’s Premiers: Taking Action on Climate Change* (2008) to document progress being made to implement strategies to conserve energy and reduce greenhouse gas emissions. The four-page booklet featured examples of education and climate change, noting that governments should support teachers, students and schools by providing guidance and resources for CCE. It also noted that all provinces and territories have elements of climate change in their school curricula.

In Manitoba, the *Sustainable Development Act* requires the government to compile a provincial sustainability report every four years. There are four education indicators found under the economic dimension of sustainability, with education highlighted as a priority for sustainable development. However, these four education indicators track traditional educational values rather than ESD-related ones. As the *Sustainable Development Act* was developed prior to ESD’s becoming a priority in Manitoba, it is being revised following extensive consultations.

Conclusion

While there has been a shift towards pan-Canadian coordination and cooperation on policy, it is too early to speak of ESD and climate change policy at the federal level, with approaches varying significantly between provinces and territories.

Philippines

Introduction

The Republic of the Philippines is an archipelago located in South-East Asia, with a population of over 98 million people spread out over 80 provinces.

The Philippines is among the top ten countries most vulnerable to climate change according to the Climate Change Vulnerability Index 2014.³³ Climate-related risks accounted for almost half of deaths and about 80 per cent of economic losses in past natural disasters. Approximately 40 per cent of the Philippine territory is likely to be affected by climate change-induced droughts, floods, and landslides.

The Department of Education is responsible for primary, secondary and non-formal education in the Philippines. Tertiary education is controlled by the Commission on Higher Education, and vocational education and training is managed by the Technical Education System Development Agency under the Department of Labor and Employment.

CCE in national education and skills development policies

The 2009 *Philippine Climate Change Act* explicitly directs the Department of Education to integrate climate change into the primary and secondary education curricula. This has in part been facilitated by the 'Knowledge and Capacity Development' strategic priority in the *National Climate Change Action Plan 2011-2028* (NCCAP). The *National Environmental Education Action Plan 2005-2014* (NEEAP) is the Philippine's initiative aligned to the United Nations Decade of Education for Sustainable Development.³⁴ The NEEAP is implemented through the *National Environmental Awareness and Education Act* (2008), which mandates the integration of environmental education into the school curricula at all levels of the formal and non-formal education sectors.³⁵ However, the integration of environmental education at all levels of basic, tertiary, and technical-vocational education has been implemented in only a few schools.

Department Order 55 (2007) endorsed and facilitated the integration of disaster risk reduction (DRR) in both structural (i.e. safe schools) and non-structural (i.e. curriculum) components of the school system. The goal of the education and research programme under the *Strategic National Action Plan for DRR* is to fully integrate DRR into both formal and informal education by 2015. Primary, secondary and tertiary school curricula are being updated to incorporate DRR. It has been incorporated into schools through full-scale emergency exercises, drawing competitions, debates and theatre performances.³⁶ Moreover, DRR has been integrated in the non-formal curriculum under the Bureau of Alternative Learning Systems of the Department of Education. Budgetary constraints remain one of the challenges in implementing DRR strategies.

The National Economic Development Authority is developing training modules for cities, municipalities and provinces to build capacity to develop, manage and administer climate change programmes as part of non-formal Climate Change Education. In nine public high schools in Bulacan province, the School-based Hydro-meteorological Information Network (SHINE) project, which started in 2008, was vital in facilitating rapid decision-making for evacuation by communities at risk of flooding at the height of Typhoon Ketsana (Ondoy) in September 2009.

CCE in national climate change and sustainable development policies

In 2009, the Philippine Government passed the *Climate Change Act*, which established the Climate Change Commission and fully integrated the priorities of the *Hyogo Framework for Action*. The Climate Change Commission produced the *National Framework Strategy on Climate Change* and the *National Climate Change Action Plan 2011-2028* (NCCCAP). The NCCCAP addressed seven urgent and immediate needs of the Philippines with 'knowledge and capacity development' focusing on education.

33. Reliefweb, 2014.

34. Philippines: Department of Environment and Natural Resources, 2011.

35. Wals, 2012.

36. Reyes, 2011.

The *Philippine Disaster Risk Reduction and Management Act* was signed into law in 2010 and complements the *Climate Change Act*. A National Disaster Risk Reduction and Management Council has been formed and supports DRR in the Philippines.³⁷ A Coordinating Council for ESD provides a clear mechanism for inter-agency collaboration and multi-stakeholder participation in the implementation of ESD. A *Sustainable Development Framework* exists and is linked with the *Enhanced Philippine Agenda 21*.

Conclusion

Several government policies in the Philippines address climate change, ESD and DRR. These policies have resulted in strategies and action plans being created to implement projects and programmes. However, there is still need to pursue coordination between various government stakeholders, to harmonize different plans and initiatives under a strategic framework that integrates CCE, DRR, and other related initiatives. Establishing a steering group or an interagency consultative group would be a way to support this harmonization.

While CCE features in some subjects in primary and secondary schools, more work remains, with only some schools having integrated environmental education at all levels. Human and financial resource limitations remain a barrier to mainstreaming DRR and CCE into the education curriculum. While progress so far has been rather slow, the outlook for Climate Change Education in the Philippines is promising. At a practical level, strengthening the capacities of schools and teachers should be considered as one of the next immediate steps.

37. Philippines: Office of Civil Defense, 2011.

Republic of Korea

Introduction

The Republic of Korea occupies the southern part of the divided Korean peninsula with a population of around 49 million. It has undergone rapid economic transformation over the past sixty years and is the only country that has made the difficult transition from being an aid recipient to a donor country.

It is situated in a temperate zone and climate change impacts are predicted to include increased rainfall, higher intensity rainfall events and rising temperatures.

Education has played a significant role in the Republic of Korea's development. A centralized administration oversees the education system from kindergarten to the final year of high school. Its education system is technologically advanced, and every primary and secondary school makes use of high speed internet. The Republic of Korea is also a leader in the development and use of digital textbooks.

CCE in national education and skills development policies

The Republic of Korea has a number of policies and initiatives supporting environmental education. In 2008, the *Environmental Education Promotion Act* encouraged the development of environmental education. It aimed to raise national environmental awareness, to encourage people to develop research and inquiry skills, and to put what they learn into action.

The Ministry of Environment, in its *2011-2015 Environmental Education Master Plan*, proposed a policy agenda for environmental education to be implemented through formal education, social environmental education and educational infrastructure approaches. The various approaches in the formal education area include:

- 'Environment and Green Growth' as an elective subject in middle and high school curricula, and classes in elementary school designed to integrate environmental education;
- the establishment of the Natural Environmental Studies Institute that offers interactive youth programmes for environmental studies;
- Environment Model Schools, designed to demonstrate best-practice;
- 'Low Carbon Challenge' involving ten universities;
- in-service training for teachers to upskill, specializing in environmental education.

Concerning social environmental education, the Ministry of Environment operates a certification system for social environmental programmes developed by public and non-government organizations. There have been 106 programmes certified as of January 2012. Many municipal-level environment education plans have been developed based on the *2011-2015 Environmental Education Master Plan*, with municipalities implementing their own local environmental education and training systems. By 2012, ten municipalities had adopted such plans, with another six in the planning process at the time of drafting this report.

The government has developed resource materials on environmental education for different target groups, sectors and media. By the end of 2011, 25 types of guidebooks, video clips and modules had been developed (ten for children, six materials for youth and nine for adults).

The Republic of Korea coordination in policy development and implementation relating to sustainable development and Climate Change Education. Many different ministries within the government have formulated policies under different names such as Climate Change Education (including disaster risk reduction), sustainable development education and green growth education, yet they share similar content. The Ministry of Education, Science and Technology (MEST) should further develop and coordinate ESD and CCE policies despite having been mandated to do so. The Presidential Committee on Green Growth (PCGG) signed a *Memorandum of Understanding on Green Growth Education* with the MEST and 13 other public agencies in 2012 as a means to create a more coherent policy approach. However, this has not yet led to the desired outcome.

CCE in national climate change and sustainable development policies

The Republic of Korea's government's strong focus on green growth has evolved from a national agenda for promoting sustainable development. The PCGG was created in 2009 and this was followed in 2010 with the *Framework Act on Low Carbon, Green Growth*. The *Act* aims to promote low carbon green growth so as to harmonize development of the economy and the environment and contribute to improved quality of life for every citizen. The *National Strategy for Green Growth and Five-Year Plan for Green Growth* were released in 2009, and the Global Green Growth Institute was launched in the same year. In 2011, the Ministry of Environment adopted the *2011-2015 National Framework on Sustainable Development*.

Green growth has been integrated across all parts of government policy, and clear targets have been set for reducing greenhouse gas emissions and fostering green technologies and industries. The Republic of Korea has allocated two per cent of annual GDP to support green growth.

Conclusion

The Republic of Korea has recently intensified its focus on environmental education. Since 2009, this has shifted towards low carbon and green growth at the expense of an overarching sustainable development programme. However, ESD and greenhouse gas emission objectives and programmes adopted by different government agencies vary based on the target groups. This indicates that there is no clear authoritative focal body to integrate and implement overall policies and guidelines for environmental education; rather, the existing policies are implemented by different governmental bodies based on sectors.

South Africa

(See also the case study in this Report)

Introduction

South Africa has a culturally-diverse population of just over 53 million. It is faced with challenges common to most developing countries including health, HIV/AIDS prevalence, extreme poverty and social inequalities. South Africa is a water-stressed economy, and climate change is likely to exacerbate the problems it faces.

The education system is divided into primary, secondary and higher education, and technical and vocational education and training (TVET). Non-formal or community-based education is also an important form of education in South Africa, especially in relation to climate change.

CCE in national education and skills development policies

The 2010 *National Curriculum Statement* emphasized the need for a healthy environment that takes account of the relationship between environment, society and economy. Though the *Curriculum Statement* does not use the language of ESD and CCE, sustainability and climate changes issues are integrated in the curriculum in various ways.³⁸ However, there is no clear reference to ESD teaching and learning practices, which means that climate and sustainability issues could further be integrated into the national education and training system.

In 2011, the Department of Environmental Affairs released a *National Climate Change Response White Paper* that set the parameters on how climate change needed to be addressed. It noted that CCE should be part of the broader framework of ESD. Specifically, it stated that climate change knowledge needed to be mainstreamed into education and training curricula.

A coordination mechanism between the Department of Environmental Affairs and the Department of Education would benefit CCE implementation. The *White Paper* addressed climate change in TVET, but there is no national strategy yet to meet the skills need for greening South Africa's economy and no governmental allocation of funds for green skills development programmes.

38. Feinstein *et al.*, 2013.

Environmental officials and teachers who are not trained in the subject find it difficult to effectively approach climate change and other environmental issues. Until recently, efforts to overcome this lack have been sporadic and dominated by NGO-driven short courses. As a result of the shortage of ESD-capable educators, South African NGOs have tended to follow educational models from northern, developed countries. However, the risk is that the models used do not take into consideration the specific national challenges. A new Teacher Education Development Programme, *Fundisa for Change*,³⁹ has been developed and represents a concerted effort to deal with the issues of strategic coordination and standard-setting through an accredited programme. Organizations such as UNESCO and the Swedish International Centre of Education for Sustainable Development also provide support for capacity-building in ESD and CCE.

There is no individual policy for education in disaster risk reduction (DRR). However, DRR is part of the 2011 *White Paper* and it refers to a governance approach to DRR that also includes non-formal education.

Non-formal CCE is not addressed in recent policy papers and for this reason remains uncoordinated and fragmented. As in formal education, the process is primarily driven by engaged individuals, often with limited resources.

CCE in national climate change and sustainable development policies

The 2011 *National Climate Change Response White Paper* includes a risk-based process to identify and prioritize short- and medium-term adaptation interventions to be addressed in sector plans. One of the cross-cutting issues in the *White Paper* is mainstreaming climate resilient development through aspects such as education and training systems. A number of short-term flagship programmes have followed the release of the *White Paper*, including energy efficiency and water conservation programmes.

While policy commitments exist for Climate Change Education, the educational aspect of climate change is currently not a priority. There seems to be a general

39. See: <http://www.fundisaforchange.co.za/>

gap between policy and strategic implementation in South Africa, with implementation being rather ad hoc and most often led by civic and higher education institute agents.

Conclusion

South Africa's *National Curriculum Statement* integrates elements of sustainability and climate change issues, but could be enhanced by making specific reference to ESD and CCE. Though the curriculum statement lacks reference to ESD teaching and learning practices, a new locally developed teacher education programme is providing a process to empower teachers for transformative environmental learning.

The *National Climate Change Response White Paper* sets out a challenging agenda for educational reform and transformation in South Africa. The approach to CCE is, in principle, that it should be part of ESD, but the policy is still fragmented and uncoordinated. Coherent and coordinated cross-sectoral response structures are they way forward, which include all government departments with a role in climate compatible development. Currently, the implementation of CCE is driven mostly by NGOs, international organizations and local initiatives supported by international bodies.

Viet Nam

Introduction

Viet Nam has a population of nearly 92 million, making it the world's 13th most-populous country. The World Bank has listed it as one of the five countries in the world potentially most affected by climate change, as so much of its population, infrastructure, and economic production are located in coastal lowlands and deltas.⁴⁰

Education is one of the priority areas for government investment (20 per cent of the national budget since 2008). Substantial progress has been made in terms of access to education, with net enrolment in primary education over 96 per cent.

General education in Viet Nam is comprised of primary, lower secondary education and upper secondary education. Vocational education comprises vocational secondary education and job training secondary education. There is also a higher education pathway.

CCE in national education and skills development policies

Viet Nam's national strategy aims to build a more sustainable, resilient society. It is working to establish a framework to create an enabling environment for ESD, including a number of initiatives that are supporting national and local authorities to develop the necessary institutions and policies to support ESD and CCE.

As a response to the United Nations Decade of Education for Sustainable Development (DESD), a National DESD Committee was formed in 2006. This committee set out ESD priorities and drafted the first *National Action Plan of Education for Sustainable Development*. The DESD has also been linked to existing environmental initiatives such as the Environmental Education in Viet Nam Schools programme and the International Decade of Water for Life Campaign. DESD initiatives are also taking place in the non-formal education sector through Community Learning Centres and Continuing Learning Centres.

The Ministry for Education and Training (MOET) has been a key enabler of ESD. Important initiatives to promote ESD and CCE in Viet Nam include:

- establishing an Education Sector Committee in 2008 to respond to climate change in the period 2009-2015;
- the *National Action Plan of Education for Sustainable Development of Viet Nam* in 2010;
- the *Action Plan for Response to Climate Change of the Education Sector for the period of 2011-2015*;
- the *Action Plan to implement the 2007-2020 National Strategy for Disaster Prevention Response and Mitigation*, adopted by MOET in 2011.
- the *MOET, UNESCO and Samsung ESD Initiative for Viet Nam*, in 2013-2014.

The *Action Plan for Response to Climate Change of the Education Sector* has set a number of specific targets to be achieved by 2015:

- four out of five leaders, managers, teachers, and lecturers in education sector will have increased awareness of climate change and climate change response;
- all teachers and lecturers will be trained on climate change and climate change response;
- all curricula, textbooks, and reference materials for teaching and learning on climate change and climate change response will be developed, endorsed and distributed to schools;
- all students will be educated on climate change and climate change response.

Viet Nam is currently developing an innovative e-learning training course on CCE in line with the current teacher training strategy. The National Institute of Educational Management has established the Centre for Research and Training on Climate Change and Disaster Risk Reduction. The Ministry has endorsed the development of contextualized tools and guidelines on school disaster preparedness and community action planning, including preparation for and mitigation of climate change challenges through biodiversity conservation.

40. Global Facility for Disaster Reduction and Recovery, 2013.

Over 11,000 Community Learning Centres (CLCs) target adult learners and provide community-based, non-formal education opportunities which integrate learner-friendly climate change materials and tools, promoting local awareness of the effects of climate change.

The role of TVET in contributing to the main goals of ESD is outlined in the *National Strategy for TVET* (2011-2020). National discussions on the roles and responsibilities of different Ministries are contributing to the development of a framework on how TVET could include CCE and ESD.

CCE in national climate change and sustainable development policies

Sustainable development has been a focus of Viet Nam's development and mainstreamed into every aspect of socio-economic development efforts for over two decades. The two overarching policy documents dealing with climate change in Viet Nam are the 2007 *National Target Programme in Response to Climate Change* (NTP-RCC) and the 2011 *National Strategy on Climate Change*. Ordinances, laws, decrees, decisions, programmes and projects have been developed to complement these national frameworks.

In 2012, the Prime Minister of Viet Nam approved the *NTP-RCC* for 2012 to 2015, which highlights the CCE approach to formal and non-formal education. One of its main components is to disseminate basic knowledge about climate change and its impacts. Additionally, MOET, in partnership with the Ministry of Natural Resources and Environment, will support the Ministry of Information and Communication to implement the information dissemination component of the *NTP-RCC*.

Box 5: Strengthening ESD in Viet Nam through a holistic, intersectoral approach

The Ministry of Education and Training (MOET), UNESCO and Samsung ESD Initiative in Viet Nam is an innovative, overarching partnership launched in 2013 to support the country in shaping a more resilient and sustainable learning society. This strategy links formal and non-formal education, bringing together schools, communities and the greater society to create an enabling environment for ESD.

The Initiative targets the training of primary school teachers on ESD, including climate change, disaster risk reduction and biodiversity conservation, through e-learning training courses and the awareness raising of school principals, parents, communities, national and local authorities and media, who have jointly developed Community Action Plans and School Disaster Preparedness Plans.

The implementation of these innovative tools and frameworks is contributing to curriculum reform, to building a learning society and to Viet Nam's implementation of a new participatory school model. The e-learning courses and other tools developed by MOET with UNESCO support will be made available for all teachers, schools and teacher training institutions nationwide. The Initiative will produce documentation and guidelines to serve as a reference for further replication.

Conclusion

While Viet Nam has built a strong institutional basis for the promotion of ESD and CCE, some obstacles remain in addressing the increasing challenges posed by climate change. As climate change issues are intrinsically linked to disaster risk reduction and biodiversity conservation, greater coordination between relevant stakeholders is required to strengthen the implementation of national frameworks and action plans.

Policies aiming to empower students, teachers, local authorities, parents and wider community members to be agents of change and create local ownership of solutions to climate change, will strengthen linkages between concerned actors. The foundations are in place for CCE to be implemented across the education sector reaching every teacher, school and community, and for it to be an integral component in national policies and strategies related to sustainable development and climate change.

CONCLUSIONS AND RECOMMENDATIONS

Challenges

1. In many countries, there is little systematic information on existing climate change-related learning and capacity development activities. Moreover, in some cases, there may be an inadequate recognition by policy-makers of the importance of education as a strategic opportunity to address climate change adaptation and mitigation. The education sector remains under-exploited as a strategic resource to mitigate and adapt to climate change.
2. The cross-cutting nature of climate change poses an unprecedented challenge to political leaders and policy-makers. It requires governments to address traditionally separate issues in an interconnected manner. A lack of clear governance structures for addressing education and skills development for sustainable development has been identified as a major barrier to coordinating and supporting the implementation of policy and/or strategic frameworks for Climate Change Education.
3. Responding to climate change and its consequences in the form of changing weather patterns, shifting agricultural production and new health risks – coupled with growing populations, accelerating urbanization, and rapidly diminishing natural resources – will require new knowledge and skills on a large scale.⁴¹ Governments will need to integrate climate change into existing curricula, supported by new approaches to pedagogy and assessment and supportive learning environments.
4. Incorporating climate-related themes and topics, as well as approaches and methods, requires teachers to have an accurate understanding of climate change and of how it relates to broader issues of sustainable development. However, as some of the case studies in this report reveal, formal teacher training opportunities to learn about climate change and how to teach it are still limited.
5. In some countries, public awareness about climate change is weak or non-existent, or the concept itself is politically challenged. A lack of easily-communicable scientific information can lead to low awareness of environmental problems and a correspondingly low sense of responsibility.

41. ILO/Cedefop, 2011; SDSN, 2013

Recommendations

This section offers five major recommendations for countries wishing to integrate Climate Change Education in the context of ESD, to help ensure that educational systems will be better equipped to prepare people for climate change mitigation and adaptation. These recommendations correspond to the challenges identified above. More detailed suggested actions can be found in the Checklist in the Annex.

1. Policy development
2. Governance and resources
3. Curricula and practice
4. Building capacity
5. Public awareness and climate change communication

1. Ensure a holistic approach to CCE

Governments should conduct a needs assessment and mapping of existing relevant policies, plans and practices prior to formulating CCE policies and plans. Ideally, this analysis could be part of the education sector diagnosis. Scientific as well as local knowledge and expertise around climate change and ESD is necessary to inform policy and practice. Governments can strengthen national scientific research capacities by supporting relevant climate change-related research and utilizing opportunities for exchange between institutions to assist in skills and technology transfer.

Enhancing climate response through education requires consideration of all dimensions of sustainable development – economic viability, social inclusion and environmental sustainability – and goes much beyond promoting environmental awareness. An effective educational response to climate change requires an understanding of the impact of climate change on the educational opportunities of marginalized, vulnerable and disadvantaged groups in society. Priority should be accorded to those who are most vulnerable to the impacts of climate change, disasters and environmental degradation. For example, reducing children's vulnerability to climate change requires specific child-friendly adaptation policies and programmes, as well as strengthening broader socio-economic development, addressing social and gender inequalities and improving political, legal and governance mechanisms as well as public services.⁴²

42. UNICEF, 2011.

2. Ensure good governance for CCE

Ensure that all relevant ministries and agencies of government are coordinated into an integrated structure of support for sustainable development. This helps to ensure a shared vision of sustainability and how it can be achieved. In other words, it helps to ensure that a common conceptual model or theory of change is shared across stakeholders and that they are working according to an agreed set of goals, approaches and division of responsibilities. Governments should also put in place appropriate mechanisms to enable structural and policy integration, coordinated planning and delivery of CCE, and efficient resource allocation. In addition, systematic monitoring and evaluation of CCE policy efforts and how these are being implemented in educational practice is crucial for the mainstreaming of high quality CCE in schools, other learning environments and society as a whole.

3. Review, develop and strengthen education curricula and practice to integrate CCE

Reorientation of education curricula will be required to ensure that a holistic, interdisciplinary and multi-dimensional approach to climate change is reflected in the classroom. In order for CCE to be effective, curricula need to be context-specific and sufficiently open and flexible to allow for different learning styles and content that makes the curriculum locally and socially relevant to learners, as well as regionally adaptable. For example, as different regions have different vulnerabilities, risk management and adaptation-focused learning should be tailored to meet such specific local and regional needs.

High quality learning in CCE is most likely to take place when it is supported by appropriate approaches not only to curricula but also to pedagogy and assessment. Active and participatory methods designed to develop critical thinking and problem-solving skills are likely to result in more meaningful access and completion levels, as well as the encouragement of lifelong learning skills needed to address climate change and future uncertainty. Participatory action and solution-focused approaches have the potential to empower people as change agents.

ESD mainstreaming in formal schools can ultimately take the form of adopting a whole-school or whole-institution approach. Effectively this entails some or all of the following: the inclusion of sustainability as a cross-cutting topic in the school curriculum; the reduction of a school's ecological footprint; the strengthening of student participation in sustainability activities in the school, home and community; and the improvement of school-community relationships in all matters related to ESD.

Making learning spaces safe, climate compatible and sustainable is an important component of CCE.

4. Build capacities of teachers and other education personnel

Governments need to recognize that teachers' knowledge, skills, motivation and self-confidence are instrumental in determining the effectiveness of CCE. Teacher education programmes should, therefore, provide designated curriculum spaces to enhance teachers' and educators' capacities to deliver accurate climate change information, integrate local content, and promote critical thinking about climate change mitigation and adaptation.⁴³ Governments should also support pre-service, in-career and in-service, and professional development opportunities in order to build teacher capacity and promote greater awareness of climate change issues among educators.

The support of school administrators and leaders is also vital for ESD mainstreaming. It is difficult to implement CCE in contexts where education leaders and board members are unaware of ESD. Governments can develop a set of criteria and implement plans for developing the capacity of school managers, inspectors and teachers and education staff at the national, regional and local levels. They should also offer support to non-formal educators and facilitators of CCE.

5. Enhance public awareness and climate change communication

Governments should support media organizations and associations in their efforts to disseminate clear messages and reliable information about climate change through print media, television and radio, and Internet-based channels of communication. Support should also be provided to journalism training programmes to ensure that future journalists will be able to report accurately and authoritatively on climate change related issues.

Partnerships and collaboration with civil society should be formed or strengthened to promote CCE in the informal and non-formal sectors. This could include youth and women's organizations, media networks, local and indigenous communities, NGOs and faith-based organizations. Governments often rely on NGOs to undertake public awareness initiatives, but NGOs and community-based organizations would benefit from appropriate frameworks and funding resources to do this important work in partnership with the public sector.

43. UNESCO/UNEP, 2011.

ABBREVIATIONS

AusAID	Australian Agency for International Development
C-neutral	Carbon neutral
CC	Climate change
CCE	Climate change education
CCESD	Climate change education for sustainable development
COP15	United Nations Climate Summit
DESD	Decade of education for sustainable development
DRR	Disaster risk reduction
EE	Environmental education
ESD	Education for sustainable development
GDP	Gross domestic product
IPCC	Intergovernmental Panel on Climate Change
LDC	Least developed country
NGO	Non-governmental organization
R&D	Research and development
SIDS	Small Island Developing States
TVET	Technical and vocational education and training
UN	United Nations
UN CC:Learn	One UN Training Service Platform on Climate Change
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
UNITAR	United Nations Institute for Training and Research
VET	Vocational education and training

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ANNEXES

CCE/ESD competencies table

Policy recommendations for Climate Change Education and ESD checklist

Regional recommendations on Climate Change Education in Small Island Developing Countries; Africa and Asia and the Pacific.

Annex 1.

CCESD Competencies¹

While CCESD can take different forms depending on local contexts and needs, it may include fostering in learners and educators the following competencies.

	KNOWLEDGE	SKILLS		DISPOSITIONS & VALUE ORIENTATION	
CCESD Competency	Learning to Know	Learning to Do	Learning to Live Together		Learning to Be
Description of Learning Competency	Understanding the climate-related challenges facing society both locally and globally and the potential role of educators and learners	Developing practical skills and action competence to address climate change mitigation and adaptation	Developing partnerships and an appreciation of interdependence, pluralism, mutual understanding and peace		Developing one's personal attributes and ability to act with greater autonomy, judgement and personal responsibility in relation to climate change
Holistic Approach (Integrative thinking and Practice)	<ul style="list-style-type: none"> The multidimensional and interconnected nature of causes and consequences of climate change The fundamentals of Climate Science Mitigation and sustainable consumption and production (SCP) Climate Change Adaptation and Disaster Risk Reduction (DRR) Local environmental conditions, associated risks, and management strategies 	<ul style="list-style-type: none"> Manage information and think and reflect critically about climate change Cope with change, complexity, uncertainty and insecurity and with the emotional realities of climate change Prepare for sudden and slow-onset disasters induced or exacerbated by climate change Prepare for 'green jobs'² 	<ul style="list-style-type: none"> Work collaboratively and act responsibly to find solutions to climate change Communicate effectively about climate change Network and interact with people of different backgrounds, origins, cultures and perspectives 	<ul style="list-style-type: none"> Stimulate dialogue about climate change causes and impacts and debate alternatives to carbon-intensive economies Challenge assumptions underlying climate change skepticism and climate change denial Explore possibilities for how human and social systems can be structured differently and promote action for more sustainable lifestyles 	<ul style="list-style-type: none"> Appreciates and values a range of different perspectives on climate change, including indigenous ways of knowing Embraces the values of solidarity, equality and mutual respect between people, countries and generations Is motivated to act to influence policy decisions and practices which jeopardize planet and people

1. This table has been inspired by UNECE (2012), which developed a table of competencies in ESD based on four pillars of education (learning to be, to know, to do, and to live together) identified in a 1996 report to UNESCO of the International Commission on Education for the Twenty-first Century, commonly known as the 'The Delors Report' (UNESCO, 1996). To learn why these competencies are important, see Mochizuki & Bryan (2014 forthcoming).

2. Green jobs include "jobs that help to protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high efficiency strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution" (UNEP, 2008). ILO/Cedefop (2011) study pointed out that all jobs can potentially become greener and not all skills required for "green jobs" are technical in nature. Preparing for "green jobs" means developing technical skills as well as transversal skills such as managing risks and solving problems.

	KNOWLEDGE	SKILLS		DISPOSITIONS & VALUE ORIENTATION	
CCESD Competency	Learning to Know	Learning to Do	Learning to Live Together		Learning to Be
	<i>The learner understands...</i>	<i>The learner is able to...</i>	<i>The learner is ready to...</i>		<i>The learner is someone who...</i>
Envisioning Change (Past, Present and Future)	<ul style="list-style-type: none"> The root causes of climate change The urgent need for change from unsustainable practices towards an advancing quality of life, equity, solidarity and environmental sustainability The importance of scientific evidence in supporting climate change 	<ul style="list-style-type: none"> Critically assess processes of change in society and envision sustainable futures Evaluate potential consequences of different decisions and actions 	<ul style="list-style-type: none"> Critically reflect on and think creatively in relation to climate change and the future Appreciate and communicate a sense of urgency in relation to climate change and inspire hope 	<ul style="list-style-type: none"> Encourage negotiation of alternative futures Critically reflect on and clarify one's world-views through dialogue, and recognize that alternative frameworks exist Contribute to the emergence of new world-views that address sustainable development 	<ul style="list-style-type: none"> Is motivated to find concrete climate-change solutions Is willing to take considered action even in situations of climate-related uncertainty
Achieving transformation (locally and globally, individually and collectively and socially)	<ul style="list-style-type: none"> Their role in contributing to climate change and in stabilizing the climate system The role of industry and corporations in intensifying the production of greenhouse gases The political and economic contexts that shape their lives and their relationship to the environment 	<ul style="list-style-type: none"> Participate actively in the learning process Critically evaluate different interests that shape responses to climate change and how climate change is represented in multiple contexts (e.g., Media) 	<ul style="list-style-type: none"> Derive solutions to different climate-related challenges Engage in individual and collective action to bring about desired changes 	<ul style="list-style-type: none"> Ensure the participation of all—including indigenous peoples—in climate change responses Contribute to a more just, peaceful, tolerant, inclusive, secure and sustainable world 	<ul style="list-style-type: none"> Is an active 'global citizen'³ Is a critically reflective learner Is resilient and prepared for challenges of today and tomorrow Ensures greater climate accountability from those whose policies and practices are responsible for climate change
Achieving transformation (in and through education)	<ul style="list-style-type: none"> The need for transformed education systems that support learning for climate change How engagement in real-world issues enhances the learning process and helps learners to make a difference in practice 	<ul style="list-style-type: none"> Provide a basis for a shift of perspectives and for change in educational practices Use the natural, social and built environment, including their own institution, as a context and source of teaching and learning Assess student learning in terms of changes and achievements in relation to Climate Change Education 	<ul style="list-style-type: none"> Support students to revisit assumptions, worldviews and powers relations in mainstream discourse Encourage students, parents, teachers and education administrators to engage in open and honest dialogue about climate change 	<ul style="list-style-type: none"> Respect differing learning styles and needs of learners Embrace whole-school approaches to ESD⁴ Value participation of all relevant stakeholders in school governance Build positive relationships with others 	<ul style="list-style-type: none"> Is confident about teaching climate change Is a creative learning facilitator Is willing to challenge assumptions underlying unsustainable practices across education systems, including their own institution

3. A 'global citizen' is someone empowered to "engage and assume active roles, both locally and globally, to face and resolve global challenges and ultimately to become proactive contributors to a more just, peaceful, tolerant, inclusive, secure and sustainable world" (UNESCO 2014, p.15).

4. A whole-school or whole-institution approach entails some or all of the following: the inclusion of sustainability as a cross-cutting topic in the school curriculum; the reduction of a school's ecological footprint; the strengthening of student participation in sustainability activities in the school, home and community; and the improvement of school-community relationships in all matters related to ESD.

Annex 2.

Policy recommendations for Climate Change Education for Sustainable Development – Checklist

Policy concerns	Gaps to be resolved	Suggested actions	Existing examples, resource materials, & support mechanisms
1. Policy development			
1.1 Input: needs analysis and input from scientific and local communities			
Needs analysis	<ul style="list-style-type: none"> Lack of systematic information on (i) the impacts of climate change on education and (ii) existing relevant climate change-related learning and capacity development activities in the country Inadequate recognition of education as an untapped strategic resource to address climate change 	<p>A1: Assess learning needs and existing capacities to deliver quality CCE</p> <p>A2: Strengthen advocacy for CCE through the UNFCCC Article 6 process by:</p> <ul style="list-style-type: none"> → Advocating for the integration of education into climate change policies and plans (e.g. NAPA) → Advocating for integrating climate change into education policies and plans <p>A3: Formulate CCE policies and plans based on the best available information of both the current and future climate in the country.</p>	<p>A1: OECD, 2009. Integrating Climate Change Adaptation into Development Co-operation: Policy Guidance</p> <p>UN CC:Learn. 2014. Guidance Note for Developing a National Climate Change Learning Strategy: Strengthening Human Resources and Skills to Advance Green, Low Emission and Climate Resilient Development</p> <p>http://www.uncclearn.org/sites/www.uncclearn.org/files/images/un_cclearn_guidance_note_final_feb_2014.pdf</p> <p>UNFCCC secretariat. 2014. Report on good practices of stakeholder participation in implementing Article 6 of the Convention.</p> <p>http://unfccc.int/resource/docs/2014/sbi/eng/03.pdf</p> <p>A2: The United Nations Alliance on Climate Change Education, Training and Public Awareness (https://unfccc.int/cooperation_and_support/education_and_outreach/items/7403.php) is currently preparing guidelines to support national focal points for Article 6 of the Convention which, once complete, should provide a useful repository of best practices in CCE.</p>

Policy concerns	Gaps to be resolved	Suggested actions	Existing examples, resource materials, & support mechanisms
Research and local knowledge	<ul style="list-style-type: none"> Shortage of scientific knowledge and expertise on climate change and/or ESD and the lack of evidence base about the positive impacts of ESD/CCE in addressing climate change ESD/CCE policies are decoupled from the challenges of SD/CC faced by the country and different groups in the country. There is no structure to support knowledge exchange and co-production. 	<p>B1: Strengthen national scientific and research capacities by</p> <ul style="list-style-type: none"> Utilizing opportunities for exchange between institutions which could assist with skills and technology transfer; Supporting research which has the potential to enhance our understanding of CCE and ESD. <p>B2: Engage diverse stakeholders in research on sustainable development (including climate change) by:</p> <ul style="list-style-type: none"> Involving schools and local communities as well as universities, research institutions and NGOs in needs analysis and diagnosis; Building effective channels for bottom-up communication from schools and communities to the policy-makers; Drawing from the knowledge and experience at the local level and combine local knowledge with information housed at higher levels. <p>B3: Support the development of coordinating units, knowledge centres, mediating agents, databases etc.</p>	<p>B1:</p> <p>DFID's DELPHE program for higher education: http://www.dfid.gov.uk/work-with-us/funding-opportunities/educational-institutions/delphe/</p> <p>UNEP's MESA - http://www.unep.org/training/mesa/toolkit.asp</p> <p>Voluntary Service Overseas - http://www.vsointernational.org/</p> <p>B2&B3:</p> <p>UNU Regional Centres of Expertise on ESD (RCEs) http://www.ias.unu.edu/sub_page.aspx?catID=108&ddlID=183</p> <p>B2: Sandwatch - http://www.sandwatch.ca/</p>
1.2 Vision: Addressing CCE in the context of ESD			
Holistic approach	<ul style="list-style-type: none"> CCE is not with the Ministry of Education and not aligned with other educational provisions Fragmented approach to sustainable development leads to overlaps and duplication of CCE-related interventions 	<p>C1: Ensure cross-sectoral planning for education and skills development by:</p> <ul style="list-style-type: none"> Involving the private sector in supporting ESD/CCE; Enhancing synergies with the other Rio Conventions on Biodiversity and Desertification to identify areas where multiple benefits can be achieved. Involving stakeholders from Disaster Management mechanisms, where they exist; Enhancing synergies between ESD/CCE and Conflict/DRR; Enhancing synergies between ESD/CCE and green skills. 	<p>C1 : UNESCO, 2010. Education for Sustainable Development Lens: A Policy and Practice Review Tool.</p>

Policy concerns	Gaps to be resolved	Suggested actions	Existing examples, resource materials, & support mechanisms
Education quality	<ul style="list-style-type: none"> • Need to improve enrolment rates, equal access and learning outcomes • Lack of relevance of education in enabling learners to deal with real-life challenges of today and tomorrow • Teaching to test • Lack of understanding of the principles and implications of ESD for the kinds of transformative changes needed in practice 	<p>D1: Build on existing education reform initiatives and Education for All measures, where appropriate, and establish a consensus on the new vision of quality education based on the holistic notion of sustainable development</p> <p>D2: Define competences to be fostered through CCESD. Incorporate learning outcomes related to ESD, including life skills and citizenship, into national quality standards</p>	<p>D2: UNECE (United Nations Economic Commission for Europe), Committee on Environmental Policy, Steering Committee on Education for Sustainable Development (2011). Learning for the future: Competences in Education for Sustainable Development, Achievements of the Expert Group on Competences in Education for Sustainable Development. Geneva, 7-8 April 2011. ECE/CEP/AC.13/2011/6</p>
Prioritizing vulnerable groups	<ul style="list-style-type: none"> • Lack of endorsement and implementation of rights instruments (e.g. CRC) • Unmet education MDGs and EFA goals 	<p>E1. Ensure that national legislation is in line with international conventions</p> <p>E2. Ensure that policies reflect rights-based and pro-poor approaches by:</p> <ul style="list-style-type: none"> → Aligning EFA policies and ESD/CCE policies → Targeting disadvantaged/vulnerable groups by paying specific attention to those who are most vulnerable: <ul style="list-style-type: none"> • Feature out-of-school children and youth as well as those with disabilities in a strategy and programme for CCE • Design effective non-formal CCE and other outreach methods so that children and youth who are not part of the school system have the opportunity to reduce their vulnerability and increase their resilience. → Scaling up low-cost interventions where appropriate and considering new interventions in light of the changing risk profiles 	<p>UNICEF East Asia and Pacific Regional Office (2011). Children's Vulnerability to Climate Change and Disaster Impacts in East Asia and the Pacific.</p> <p>Children in a Changing Climate (2010). Child Rights and Climate Change Adaptation: Voices from Kenya and Cambodia. Institute of Development Studies (IDS); Plan International</p> <p>D2: YUNGA is developing dedicated non-formal education resources: a Climate Change Challenge Badge as well as a Youth Guide to Climate Change. Existing YUNGA Challenge Badges already feature climate elements. See: www.yunga-un.org</p> <p>United Nations Joint Framework Initiative on Children, Youth and Climate Change. 2013. Youth in action on climate change: inspirations from around the world. The Publication is available in Arabic, Chinese, English, French, Russian or Spanish. http://unfccc.int/cc_inet/cc_inet/information_pool/simple_search/items/3522.php?displayPool=1584</p>

Policy concerns	Gaps to be resolved	Suggested actions	Existing examples, resource materials, & support mechanisms
Preparing for the green economy	<ul style="list-style-type: none"> The education sector is not prepared for a transition to the green economy. 	<p>F1: Conduct research to assess the impact of greening economies on skill needs in the country</p> <p>F2: Develop programmes, curricula, accreditation and assessment structures for new 'green' occupations (e.g. renewable energy, recycling, sustainable agriculture)</p> <p>F3: Promote cross-cutting, transversal skills (soft skills for green jobs) such as critical thinking at all levels and types of education and training</p>	UNESCO (2012). ESD + TVET: Promoting Skills for Sustainable Development.
2. Governance and resources			
Leadership and strategic direction	<ul style="list-style-type: none"> Lack of coordinating mechanisms related to ESD or lack of engagement of relevant ministries and sectors in an existing ESD coordinating body 	<p>G1: Put in place appropriate mechanisms to enable structural and policy integration and coordinated planning and delivery of CCESD. Specific arrangements, structures and processes that would help to ensure good CCESD governance by, for example:1</p> <ul style="list-style-type: none"> → Forming a high-level interdepartmental committee/s to ensure coordination across all government stakeholders; → Designating one government department/agency to be the focal point for long-term strategic directions and planning, operational coordination and evaluation of ESD; → Establishing an external Advisory Committee for CCESD, comprising all relevant nongovernment stakeholders, to provide (i) coordinating links down to local government agencies and the professional CCESD community, and (ii) mechanisms for nongovernment stakeholders to contribute to policy, planning and implementation of CCESD; → Establishing strong central research services to provide all stakeholders with the best advice on theory, practice and evaluation of CCESD. 	Fien, J. 2012. Governance and Education for Sustainable Development – An analysis and synthesis of governance and related frameworks, policies and strategies in Education for Sustainable across five jurisdictions: England, the Netherlands, Germany, Ontario and Victoria. Report prepared for the Office of Environment and Heritage, New South Wales Department of Premier and Cabinet, Australia. October 2012. http://www.environment.nsw.gov.au/resources/community/FienGovEfSDRpt.pdf
Cross-learning and information sharing	<ul style="list-style-type: none"> Inadequate information flow among professionals as well as multi-stakeholder partnerships 	<p>H1: Promote exchange of experiences among professionals by, for example,</p> <ul style="list-style-type: none"> → Organizing meetings among staff to discuss and define roles and areas of cooperation; → Developing a clearinghouse on activities and experiences at different levels; and → Implementing staff exchange. <p>H2: Put in place appropriate mechanisms to enable vertical and horizontal coordination. Specific arrangements may include the following:2</p> <ul style="list-style-type: none"> → Establishing local/regional CCESD Working Groups, comprised of all relevant stakeholders, to provide local/regional coordination and support; → Providing support for cross-regional networking and advisory services to facilitate local/regional implementation and cross-learning. 	

Policy concerns	Gaps to be resolved	Suggested actions	Existing examples, resource materials, & support mechanisms
Budget coordination & Resource allocation	<ul style="list-style-type: none"> Budgets are fragmented and do not allocate resources efficiently ESD is not considered a priority and thus insufficient resources are allocated Rigid regulations prevent resources from being attributed effectively where they are needed 	<p>I1: Ensure effective planning and budgeting by:</p> <ul style="list-style-type: none"> → Ensuring high-level recognition of the resource implications of the complex challenge of coordination brought about by the existence of multiple relevant national and/or state/provincial level government departments as well as industry, community, NGOs, professional associations and education stakeholders; → Ensuring effective planning and budgeting in the education sector and with other sectors; → Ensuring that CCE-related funding from different ministerial budgets (environment, health, science & technology) is coordinated and making room in the budget for education responses identified in the context of cross-sectoral plans; → Aligning climate change adaptation (CCA) and disaster risk reduction (DRR) interventions So as to reinforce the links between CCA and DRR in the context of the implementation of the Kyoto Framework of Action and the post-Kyoto Framework. <p>I2: Meet the additional costs of integrating the needed measures into planned activities by:</p> <ul style="list-style-type: none"> → Reallocating funding to (or increasing budget for) the education sector and fund CCE-specific activities → Establishing a horizontal fund for adaptation which sectoral ministries could tap into, along with → the Global Environment Facility (GEF) and Global Partnership for Education (GPE), where appropriate. → Conducting capacity development activities to prepare proposals under existing or new climate change and/or education funding regimes. → Developing public-private partnerships. <p>I3: Allow flexible use of funds to support activities for climate-resilient and climate-friendly schools, CCE-related training programmes, and developing necessary governance and knowledge development and sharing platforms</p>	<p>Examples of CCA and DRR alignment at FAO:</p> <ul style="list-style-type: none"> → See p.67-71 of Resilient Livelihoods (http://www.fao.org/docrep/015/i2540e/i2540e00.pdf) → Exchange of technologies and practices on CCA & DRR on the TECA platform: http://teca.fao.org/technology-categories/climate-change-and-disaster-risk-reduction → FAO's work in the Bicol region of the Philippines: http://www.fao.org/docrep/018/i3343e/i3343e.pdf <p>I2: Example of public-private partnerships</p> <p>Samsung-UNESCO ESD Project in Viet Nam (see Box 5)</p>

Policy concerns	Gaps to be resolved	Suggested actions	Existing examples, resource materials, & support mechanisms
M&E awareness and systems	<ul style="list-style-type: none"> Lack of policies or weak expectations on monitoring and evaluation No robust monitoring or evaluation systems are put in place 	<p>J1: Raise expectations on M & E by:</p> <ul style="list-style-type: none"> → Training policymakers in the importance of M & E; → Training and involve school heads and inspectors in M & E . <p>J2: Develop and/or improve systems for M & E based on national quality standards and indicators by:</p> <ul style="list-style-type: none"> → Building consensus on what indicators of performance and effectiveness of the CC curriculum should be; → Developing and/or improving systems for M & E that relate to all levels; → Improving M & E of performance at schools and in non-formal education programmes. 	
3. Reorientation of curricula and practice			
3.1. Teaching, learning and content			
Curriculum review, pedagogy and assessment	<ul style="list-style-type: none"> The curriculum is overcrowded and is concentrating on academic skills (“teaching to test”) and only assessing these skills. Climate change issues are not covered in the curriculum or are covered inadequately. Methods being used neither encourage high-order thinking skills nor allow for diverse teaching and learning styles. Limited stakeholder input into curricular reforms 	<p>K1: Ensure that curricula include a broader focus than only academic skills. Reorient the entire curriculum from the perspective of equipping learners with requisite competences to contribute to sustainable development, rather than inserting new thematic contents into the overcrowded curriculum.</p> <p>K2: Incorporate methods which assess learning outcomes related to ESD – including life skills and citizenship –into the wider evaluative framework.</p> <p>K3: Integrate knowledge of climate science; causes and consequences of climate change; climate change mitigation; CCA and DRR, and the interconnected and complex nature of climate change in the curriculum (also see Table 1 on ESD competencies as applied to CCESD)</p> <p>K4: Encourage ‘productive pedagogies’ which promote higher order thinking skills (such as critical thinking and problem solving); are focused on identifying and solving intellectual and/or real-world problems; connect with learners’ background knowledge on a given topic; bring diverse cultural knowledge into play; foster active citizenship and democratic participation; provide opportunities for sustained dialogue between students, and between students and teachers³</p> <p>K5: Involve relevant stakeholders in the development of new and revised curricula</p>	UNESCO/UNICEF, 2012. Disaster Risk Reduction in School Curricula: Case Studies from Thirty Countries. http://unesdoc.unesco.org/images/0021/002170/217036e.pdf

Policy concerns	Gaps to be resolved	Suggested actions	Existing examples, resource materials, & support mechanisms
Context, relevance and flexibility	<ul style="list-style-type: none"> The curriculum is prescriptive and non-flexible The education system is resistant to change. 	<p>L1: Provide support when needed and make curricula open and flexible, allowing for different learning styles and content that make the curriculum relevant to learners and society</p> <p>L2: Apply a flexible approach to wider education system itself, as it may require adaption to seasonal changes (e.g. adapting the school year, exam calendar and textbook distribution) in light of climate change and may need to enhance its capacity to respond to displacement and migration streams as a consequence of climate-related disasters.⁴</p>	
3.2 Learning environments			
Whole-school approaches	<ul style="list-style-type: none"> What whole-school approaches entail is not well understood. Whole-school approaches require scaling up. 	<p>M1: Encourage schools to:</p> <ul style="list-style-type: none"> → Include sustainability as a cross-cutting topic in the school curriculum; → Reduce a school's ecological footprint; → Strengthen student participation in sustainability activities in the school, home and community; → Improve school-community relationships in all matters related to ESD. <p>M2: Increase the number of schools which have developed school sustainability plans in cooperation with the community</p>	
School infrastructure	<ul style="list-style-type: none"> There are no uniform standards and directives for making learning environment safe and conducive to learning Many school buildings are neither climate-resilient nor climate-friendly Many schools have inadequate sanitation facilities 	<p>N1: Develop standards for the construction of safe, climate compatible and sustainable schools.</p> <p>N2: Develop policies on and building capacities for climate proofing and eco-retrofitting school buildings.</p> <p>N3: Equip schools with adequate sanitation facilities.</p>	

Policy concerns	Gaps to be resolved	Suggested actions	Existing examples, resource materials, & support mechanisms
4. Building capacity			
Teacher education	<ul style="list-style-type: none"> • Lack of professional development opportunities <ul style="list-style-type: none"> → Lack of incentives and professional development of teachers → Insufficient learning resources on ESD/CCE → Teachers do not welcome a new challenge but see it as a problem • Teacher training is outdated. <ul style="list-style-type: none"> → Lack of gender sensitivity and gender responsiveness → Teaching staff is not yet familiar with the use of ICT • Difficulty of addressing individual needs of learners <ul style="list-style-type: none"> → Lack of materials that support the needs of particular groups of learners 	<p>O1: Provide professional development opportunities by:</p> <ul style="list-style-type: none"> → Improving pre- and in-service training, mentorship, teambuilding → Adapting existing learning resources on ESD/CCE to local contexts → Encouraging teachers to organize their work in teams and to apply problem oriented teaching methods <p>O2: Promote the use of new and alternative methods for teaching by:</p> <ul style="list-style-type: none"> → Providing gender sensitization programmes for teachers and gender-sensitive teaching materials → Encouraging the use of new technology and ICTs <p>O3: Address individual needs of learners by:</p> <ul style="list-style-type: none"> → Encouraging methods for planning education based on individual educational needs → Encouraging teachers to respect diversity and different learning styles among their pupils 	<p>UNESCO (2013). UNESCO course for secondary teachers on CCESD: Climate Change in the Classroom http://unesdoc.unesco.org/images/0021/002197/219752e.pdf</p>
Non-teaching staff capacity	<ul style="list-style-type: none"> • There is no structured planning for capacity building of support staff in schools • No specific requirements have been established for capacity development of school managers and inspectors 	<p>P1: Initiate the elaboration of capacity development plans for non-teaching staff both at national, regional and local levels</p> <p>P2: Develop a set of criteria for the requirements of capacities needed for school managers and inspectors</p> <p>P3: Build capacity of non-formal educators</p>	<p>P3: FAO (2014) Junior Farmer Field and Life School Climate Change Module: Facilitator's Guide: http://www.fao.org/fileadmin/user_upload/fao_ilo/pdf/Other_docs/FAO/JFFLS_CC.pdf</p> <p>Translations and other JFFLS modules can be found here: http://www.fao-ilo.org/?id=20904</p>

Policy concerns	Gaps to be resolved	Suggested actions	Existing examples, resource materials, & support mechanisms
5. Public awareness and climate change communication			
Public awareness	<ul style="list-style-type: none"> • People are not aware of climate change or do not accept it as real (Climate change denialism). • Climate change paralysis and climate change fatigue • Weak performance in science is associated with low awareness of environmental problems and low sense of responsibility supporting sustainable environmental management.⁵ 	<p>Q1: Communicate scientific consensus on human-induced climate change effectively by</p> <ul style="list-style-type: none"> → Training media professionals → Providing support and training to educators at all levels (also see Capacity Development above) → Raising awareness among local stakeholders (e.g. households, local organizations, opinion leaders, community leaders) <p>Q2: Adopt an approach to empower learners to understand and critically engage with climate change, rather than emphasizing the apocalyptic consequences to children and youth.</p> <p>Q3: Enhance national performance in science By:</p> <ul style="list-style-type: none"> → Increasing the quality of science education at all levels for informed public debate on issues such as climate change and wider environmental problems → Providing support and training to educators at all levels to deliver quality education about complex, climate-related topics in ways that are both relevant to local contexts and meet wider educational targets (e.g. literacy, numeracy, employability) 	<p>Q1: The Psychology of Climate Change Communication: A Guide for Scientists, Journalists, Educators, Political Aides, and the Interested Public, published by the Center for Research on Environmental Decisions at Columbia University. (http://guide.cred.columbia.edu/)</p>

Sources: Developed based on UNESCO, 2009, Policy Guidelines on Inclusion in Education, Figure 5, pp. 23-26; UNESCO, 2010, Education for Sustainable Development Lens: A Policy and Practice Review Tool; and UNESCO Bangkok, 2012, Education Sector Responses to Climate Change. Some wording has been taken directly from these UNESCO documents. Gaps to be resolved (second column) and suggested actions (third column) have been derived from various sources (see References).

(Footnotes)

1. Fien, 2012
2. Fein, 2012
3. Lingard, Hayes, and Mills, 2003
4. UNESCO Bangkok, 2012.
5. UNESCO, 2008

Annex 3.

Recommendations from the UNESCO Regional Expert Meetings on Climate Change Education for Sustainable Development and Adaptation

IN SMALL ISLAND DEVELOPING STATES

UNESCO, with support from the Governments of Japan, Denmark and the Commonwealth of the Bahamas, organized an Expert Meeting on Climate Change Education for Sustainable Development and Adaptation in Small Island Developing States on 21-23 September 2011 in Nassau, the Commonwealth of the Bahamas. The 76 participants from 29 countries adopted the following recommendations on Climate Change Education for Sustainable Development in Small Island Developing States. The recommendations are addressed to UNESCO, Member States, educators and other stakeholders:

- 1. Take into account the interdisciplinary nature of Climate Change Education for Sustainable Development (CCESD),** which is an integral part of Education for Sustainable Development (ESD). CCESD should be integrated **across curricula at all levels to ensure learning across the life-cycle.** It should encompass **formal, non-formal and informal education.** A holistic approach to CCESD must recognize the complexities of climate change, addressing – and drawing upon – a range of disciplines and areas of expertise, including climate science, policy, law, ethics, sociology, economics and culture, and aim for the more effective and inclusive sharing of such knowledge. It must be guided by considerations of equity and the impact of climate change on society.
- 2. Link the local and global perspectives.** To be effective and relevant to the learner, CCESD should be **contextualized and linked to local phenomena and issues** by covering topics such as food security, water resources, gender equality, and human security in pursuing livelihoods of choice. This local focus must be linked to the **global perspective, creating an understanding of the causes and ethical implications of climate change at the global level.**
- 3. Build teachers' and educators' capacities** to deliver accurate information, integrate local content, and promote critical thinking about and take action on climate change mitigation and adaptation. Promote the reform of **teacher education institutions** while ensuring the immediate delivery of community-oriented in-service training and mentoring for teachers to gain confidence in teaching CCESD content.
- 4. Further encourage the development of pedagogies that support quality education,** with special emphasis on the development of knowledge, skills, values and competencies required to mitigate and adapt to climate change in SIDS, including quality mathematics and science education. This will require replacing traditional, rote-learning methodologies with **problem-solving, inquiry-based and future-oriented learning** anchored in the local community, enhancing the quality of mathematics and science education as well as greening technical and vocational education and training.
- 5. Adjust educational planning** to climate change, taking into account the impacts of climate change on migration patterns and school enrolment, infrastructure maintenance and personnel, as well as disaster risk management. This will require a comprehensive analysis of risks, vulnerabilities and opportunities for the integration of CCESD across the education system, that is, in policies and legislation; education sector plans and budgets; curricula and examinations; teacher education; school infrastructure and facilities; learning environments; and school governance and management. This requires capacity-building activities for policy-makers, educational planners, and school governors and managers.
- 6. Involve learners and communities, as well as teachers and educators, in the planning and design of educational programmes and activities.** It is essential that learners, whether in the formal, non-formal or informal context, take ownership of their adaptation and mitigation measures. Learners, along with parents and the wider community, must be involved in educational planning, including curriculum development.
- 7. Link and where possible integrate education for disaster risk reduction and Climate Change Education.** The preparations and actions for disaster risk reduction are closely related to those needed for climate change adaptation. Establishing this linkage in educational policies and programmes will also allow for the demonstration of the urgency and direct impacts of climate change on SIDS.
- 8. Link CCESD to the arts and culture.** The arts, whether photography, music, dance, painting, poetry, video production or other forms of expression, have proven to be an effective means through which to engage SIDS populations on climate change issues.
- 9. Support the maintenance of healthy ecosystems.** The degradation of ecosystems and the services they provide caused by land use change and resource exploitation is contributing to increasing the vulnerability of SIDS to climate change. Improving natural resource management and raising awareness about ecosystem services are an integral part of building resilience to climate change.
- 10. Support peace-building and peace-keeping,** and prepare learners and educators to cope with forced migration and other potential threats to human security posed by climate change.

- 11. Learn from local and indigenous knowledge and respect other systems of knowledge and values.** Educational programmes should be built upon an in-depth understanding of the learners' knowledge, creativity, experience and perceptions. Learning should be based not only on science but also on contributions from local and indigenous knowledge systems, value systems and languages. Establishing this integration is essential in many SIDS. Among Polynesian and other Pacific peoples, the relationship of people, land, sea, ancestors and the spiritual realm constitutes the very basis for understanding environmental change and its impact on society. Where appropriate, CCESD should be pursued in cooperation with organizations and groups that exercise a key influence on SIDS societies' values and norms, such as faith-based organizations and community elders.
- 12. Tailor education programmes and public awareness campaigns to the human rights and unique needs of different learner groups.** Different learner groups have different information needs. Children and adults understand and react differently to the learning experience. Likewise, communication and education strategies must take account of learners' languages, gender, cultures and their relative positions within society. Throughout, respect for every learner's human rights is imperative.
- 13. Reach and empower the most vulnerable.** The most vulnerable to climate change are those facing the greatest difficulty accessing information and education. These include children and adults, especially girls, women and those with disabilities, those from poor families, indigenous groups, ethnic minorities and communities living in particularly vulnerable locations such as coastlines. In Pacific SIDS, the engagement of vulnerable and marginalized groups has been achieved through partnership arrangements between NGOs and Ministries of Education, where NGOs address ESD and CCESD needs in remote and marginalized communities and in informal contexts.
- 14. Diversify climate change communication.** The use of information and communication technologies, especially social media and mobile phones, represents a powerful resource for CCESD, enabling active exchange and networking among SIDS learners and educators at the local, regional and global levels. The use of such resources should be complemented by a concerted effort to utilize other means to reach populations without internet access, who are often among the most vulnerable to climate change.
- 15. Link education and research.** The nexus between education and scientific research is a powerful domain with the potential to empower SIDS communities. Cooperation between the **educational and research communities should be further developed, with an emphasis on active engagement of schools and communities in the research endeavour** – for example through their participation in data collection. This can be achieved through the design and promotion of educational programmes through which learners experience their local social and natural environments first-hand, collecting data, analyzing and sharing their findings – and taking action to address problems identified. This will lead to a better appreciation of the environment among learners and researchers alike, generate essential local data, and link the research and education agendas. However, this will require long-term efforts that go beyond the standard project cycle. UNESCO World Heritage sites have the potential to serve as places of learning and research on the environmental and socio-cultural aspects of climate change and adaptation in SIDS.
- 16. Encourage the development of common research agendas for SIDS,** including the identification of areas where schools and communities can contribute through participation in research in their communities and out-of-classroom project activities. The leading role of SIDS in climate change research may benefit from the potential of SIDS to serve as living laboratories for long-term climate studies. For example, the Bahamian blue holes - marine sinkholes up to 200 metres deep - represent a unique and largely unknown geological, paleontological and archaeological record of climate and sea level variations over long periods of time.
- 17. Support intra- and inter-regional SIDS-SIDS cooperation.** Although SIDS regions and sub-regions are very diverse, they share a particular vulnerability to climate change and face similar adaptation constraints and opportunities. **Encourage cooperation between SIDS and other countries** that are and will be seriously affected by climate change. Sharing and exchanging knowledge, good practices and information among SIDS education and research communities has the potential to promote partnerships, and inform and advance CCESD as well as the research agenda. Make use of existing networks and SIDS knowledge management platforms like SIDSnet, Islands Communication Network and the University Consortium of Small Island States (UCSIS) for these purposes.
- 18. Adopt a system-wide approach.** Engage with sectors other than education, including the private sector, and develop a cross-sectoral approach to CCESD to create awareness about the benefits of addressing and incorporating CCESD into regional and national climate change plans and policies and poverty reduction strategies. Build regional and national capacity for the integration of education in SIDS climate change mitigation and adaptation strategies.
- 19. Ensure that adaptation funds** are made available to support CCESD, which represents an important strategic dimension of climate change adaptation efforts in SIDS.
- 20. Advocate for Climate Change Education in SIDS and mainstream CCESD in international mechanisms and processes** such as the United Nations Framework Convention on Climate Change (UNFCCC) Article 6 and the United Nations Conference on Sustainable Development (UNCSD), particularly its meeting in 2012 in Rio de Janeiro, as well as the wider global development and education agendas such as the UNESCO-led United Nations Decade of Education for Sustainable Development (DESD), the drive for Education for All (EFA), the United Nations Literacy Decade (UNLD), and the Millennium Development Goals (MDGs). Ensure that CCESD activities continue after the end of the DESD in 2014. Create synergies with the outreach programmes of other major multilateral environmental agreements such as the Communication, Education and Public Awareness (CEPA) Work Programme of the Convention on Biological Diversity (CBD).

The participants offer these recommendations for consideration and adoption by all stakeholders engaged in Climate Change Education for sustainable development and adaptation in small island developing states.

23 September 2011, Nassau,
The Commonwealth of the Bahamas

IN AFRICA

These recommendations are the outcome of the experts meeting on Climate Change Education for Sustainable Development in Africa that UNESCO organized in cooperation with the Government of Mauritius, with financial support from the Governments of Japan and Denmark, on 20-22 March 2013 in Balaclava, Mauritius. They were adopted by 82 participants from 25 countries and are addressed to UNESCO and its Member States and all relevant stakeholders including education planners, researchers and practitioners. They are intended to inform future work on Education for Sustainable Development (ESD) in Africa as well as the development of an ESD programme framework to follow on the UN Decade of ESD (2005-2014).

- 1. Use the concept of Education for Sustainable Development as a common framework for Climate Change Education (CCE).** ESD provides the required interdisciplinary content and pedagogies that support competencies needed to prepare learners to adapt to climate change impacts and mitigate climate change causes.
- 2. Integrate CCE into teaching and learning at all levels and in all areas of education (formal, non-formal, informal) and throughout life.** Teaching about climate change and other key sustainable development issues should be undertaken in a holistic manner, whereby the linkages between the different levels and in particular between secondary and tertiary levels should be strengthened. Non-formal CCE programmes should particularly aim to reach out-of-school youth and other vulnerable groups. Taking a **whole-school/whole-institution approach** offers a concrete opportunity for schools and institutions to put climate change adaptation and mitigation into practice and to contribute to sustainable development. Such an approach means that schools and institutions integrate principles of sustainable development into curriculum design, teaching and learning methods, the school community, the campus management and school-community interaction. African examples include Eco-Schools, ESD Model Schools and ESD Villages.
- 3. Link the global and local perspective.** Teaching and learning that responds to the global dimension of climate change creates an understanding of the causes and ethical dimensions of climate change. Taking on a local perspective on climate change – Including recognizing the value of and learning from local knowledge – helps learners to contextualize and observe the local impact of climate change. It makes education more relevant to communities and individuals. Above all, it provides students with the possibility of learning by doing and empowers learners to take action on climate change causes and impacts.
- 4. Address climate change adaptation but also mitigation through African education systems.** African countries are among the most vulnerable to climate change impacts. Education systems therefore should focus on preparing learners to adapt to climate change consequences. Mitigating the causes of climate change is not confined to the reduction of emissions. It includes promoting sustainable development practices such as sustainable production and consumption, sustainable agriculture, and hence should be a concern for CCE programmes in Africa.
- 5. Take into account the complexity and interdisciplinary nature of CCE.** Disaster risk reduction (DRR) education and education for climate change adaptation are closely related. CC and DRR education should be integrated in curricula in existing subject areas in a multidisciplinary manner and linked to other sustainable development issues such as agriculture, water, urban planning and the preservation of ecosystems. The curriculum should respond to the specific needs of countries. National or regional baselines for both formal and non-formal CCE programmes and curricula should be established, based on existing programmes and resources. **Linkages between DRR and CCE should be forged.** Natural disaster awareness can help show the severity of CC and create awareness on CC and the urgency to act.
- 6. Consider the integration of values which support the ethical and spiritual appreciation of the environment as an integral part of CCE.** Faith-based and other civil society and value-based groups such as the Earth Charter Initiative could possibly be involved as partners in the ethical and spiritual discussion around climate change.
- 7. Learn from and respect different knowledge sources such as local and indigenous knowledge.** Educational programmes should be built upon an in-depth understanding of the learners' knowledge, on accurate science as well as on contributions from local and indigenous knowledge systems.
- 8. Encourage the development of pedagogies that support interactive, participatory and future oriented learning for CCE.** Develop the capacity of teacher education institutions as well as teachers to apply such pedagogies through pre and in-service training.
- 9. Advocate for CCE in Africa in the context of international mechanisms and processes.** Remind governments, which signed UNFCCC (Article 6), to commit support and resources to CCE. Promote through the *UN Alliance on Climate Change Education, Training and Public Awareness* the need for CCE in Africa during dialogue and negotiation meetings such as in the UNFCCC processes. CCE in Africa should further be included in a future framework for ESD to follow up on the UN Decade of ESD.
- 10. Stress the importance of national policy support and policy development for CCE.** CCE should be integrated into CC policy frameworks such as National Adaptation Programmes for Action (NAPA) and the National Climate Change Response Strategies (NCCRS). National programmes with strong policy support, like *Maurice Ile Durable*, contribute considerably to the sustained success of CCE. CCE implementation should be on the African regional environmental education and training action plan, being developed at present under the aegis of the African Ministerial Conference on the Environment (AMCEN).
- 11. Include CCE competencies and skills into assessment frameworks.** ESD-oriented principles should be integrated into national qualifications frameworks based on defined learning outcomes across educational levels.
- 12. Engage with youth** in CC actions, discussions and peer to peer learning. Make use of information and communication technologies, such as mobile phones and social media (Facebook, Twitter, etc.) to reach youth and engage them in networking activities on CC.

13. Develop group-specific education and outreach programmes. Engage in dialogue, use local languages and agents of change to reach different target groups such as communities, girls and women, youth, rural populations and farmers. Translate the complex scientific jargon on climate change science and politics in a language that is understandable to the wider public, while ensuring the recognition of local and indigenous climate change perspectives. Undertake community-engaged research and data collection to improve the quality of research results and to increase ownership. Promote ICT and e-Learning initiatives related to CCE.

14. Integrate skills development for green jobs and employment in Technical and Vocational Education and Training (TVET) institutions and support sustainable livelihoods. TVET institutions should become centres of excellence for skills for green jobs. Eco-School programmes could further be scaled-up and include TVET institutions.

15. Develop, share, disseminate and scale up good practices as a means to promote CCE regionally. Examples of good practices such as the Regional Centres for Expertise in ESD, the Eco-Schools Network, the Young Masters Programme on Sustainable Development, Sandwatch as well as national programmes on ESD should be shared among countries and regions.

16. Develop indicators and monitoring tools and frameworks to monitor and measure the impact of CCE programmes, activities, and projects. It is proposed to develop regional monitoring and evaluation tools for CCE for Eastern Africa and other regions.

17. Promote the inclusion of CCE into funding mechanisms such as the African Adaption Funds, Green Climate Fund, Climate Investment Funds and the Global Environment Facility.

18. Seek collaboration and partnerships for CCE such as inter-ministerial collaboration and partnerships with civil society, communities, media, the private sector etc. Establish Regional Centres of Excellence, an East African regional CCE network and promote on-going regional partnerships in Africa, such as the Initiative on Mainstreaming of Environment and Sustainability in African Universities (MESA).

22 March 2013,
Balaclava, Mauritius

ASIA AND THE PACIFIC

These recommendations are the outcome of the Experts Meeting on Climate Change Education for Sustainable Development in Asia and the Pacific that UNESCO organized in cooperation with SEAMEO-INNOTECH, with financial support from the Government of Japan.

They were adopted by 95 participants from 28 countries and are addressed to UNESCO and its Member States as well as all relevant stakeholders including education planners, researchers and practitioners.

1. Recognize the diversity of children and youth and ensure that Climate Change Education (CCE) programmes targeting children and youth are **inclusive. Include youth in an authentic manner** and not as a homogenous youth group in all stages of the process through participatory **planning, decision making, implementation and valuing their contributions.**

2. Sensitize and empower children and youth to drive child and youth led activities/action promoting children and youth as 'agents of change' (*"let them go"*). Empower young people to gain knowledge through leadership training, technologies including social media, TV, radio, storytelling, festivals, etc. The use of local language is important.

3. Promote whole school approaches and community engagement. Involve all stakeholders into activity planning of CCE and disaster risk reduction (DRR) from the beginning. Link school, community and government activities and involve children and youth as equal partners in these activities. This can help relate climate change to the personal lives of children, youth, families and communities and create ownership of climate change issues.

4. Learn through intergenerational dialogue for designing and implementing smart climate CCE with and for children and youth. Promote better communication and establish connections within and between generations. Particularly exchanges between children / youth and the elderly may add value. Cultural identities have to be taken into account. Engage local indigenous experts in defining socially and culturally appropriate approaches.

5. Integrate CCE into the curriculum across all levels (from early childhood to higher education) and subjects and make use of participatory teaching and learning pedagogies such as peer to peer teaching and learning, team teaching, experimental hands on learning (e.g., play, demonstrating flooding, flash flooding, cutting trees and plants and its negative impact on landslides and flood) to facilitate the transition from school learning to community action. Non-formal CCE is important. Education material should be age appropriate, context specific, in local languages and should be visual.

6. Build teachers' and educators' capacities to facilitate learning of climate change, disaster preparedness and sustainable development, relating scientific knowledge to indigenous knowledge, promoting critical thinking, problem solving and taking action on climate change adaptation and mitigation.

7. Promote participatory research and knowledge management for CCE; e.g. through documenting children's stories after disaster (photo, video, drawings), and knowledge, attitude and practice surveys.

- 8. Link the global and local perspective.** Teaching and learning that responds to the global and local dimension of climate change creates an understanding of its causes and ethical dimensions, including recognizing the value of and learning from local knowledge. This helps learners to contextualize and observe the local impact of climate change. It makes education more relevant to communities and individuals and empowers learners to take action on climate change causes and impacts.
- 9. Develop partnerships for CCE** that are sustainable, that are based on participation and focus on collaboration and are inclusive of several stakeholders - *"Walk the talk"*. Such partnerships can expand CCE programs in scope – beyond formal education, outreach – bring the message to communities and draw from complementary competencies of partners *"leveraging each stakeholder's strengths"*.¹
- 10. Learn from and respect different knowledge sources such as local and indigenous knowledge.** Educational programmes should be built upon an in-depth understanding of the learners' knowledge, on accurate science as well as on contributions from local and indigenous knowledge systems. Examples include: make use of traditional weather forecasting, religious belief, mountain observation, guidance from the stars (for voyaging and navigation), calendar for planting and fishing (food security), keeping history and local language alive through music (dance and oratory).
- 11. Coordinate and mainstream DRR in education** through a comprehensive school safety framework (infrastructure/ facilities, management and learning/teaching). Strengthen the coordination between community preparedness and school preparedness and support connecting action from **national level to local level, to school level.**
- 12. Increase the effectiveness of DRR education programs** through a **child centred approach**, involve children and youth in the assessment and planning of DRR programmes and **enrich CCE and DRR teaching through the use of cultural practices** such as folk songs, music and children's stories/folk tales which are familiar to children.
- 13. Design technical, general and non-formal education programmes that support the development of green and blue skills** to address and cope with sustainability challenges such as climate change. Greening existing jobs in the region calls for efforts to revise existing curricula, qualification standards, and programmes at all levels to prepare learners to support the changes in fields of work and business, which are heavily implicated in the consumption of energy, raw materials and water and the utilization of secondary resources.
- 14. Strengthen the development of green skills through**
1) partnerships between learning institutions, government, academic, corporate/private sector and communities to stimulate green entrepreneurship training and work based training etc., **2) policies on green growth** and industries and **3) research on sustainable business solutions** and take into consideration social equity.
- 15. Promote a solutions-oriented, values-based – formal and non-formal – education for sustainable consumption at all levels.** Promote sustainable lifestyles that are attractive and fashionable to (young) consumers ('make it cool') in order to change mind-sets and counterbalance peer pressure and consumerism. To help address the 'Value-Action Gap', foster innovations for sustainable lifestyles, work with youth ambassadors, 'influential' celebrities and community leaders, engage the media, create school awards for sustainability teaching and learning, internship schemes, film festivals, etc.

The participants of the expert meeting further commit to strengthening their efforts in promoting Climate Change Education for Sustainable Development as a contribution to the Global Action Programme on ESD.

Edsa Shangri'la, Mandaluyong, February 12, 2014
 Manila, Philippines

(Endnotes)

1. Partnerships include Public-Private-Partnership; Corporate Social Responsibility (CSR) programmes; sub-regional networks such as the Tripartite Environmental Network (Japan, Korea, China); university - schools and community partnerships such as the United Nations University's Regional Centres of Expertise (RCE) and the Education Health, Livelihood and Peace Program (EHELP); global and regional alliances such as the Asian Coalition for School Safety (ACSS) and the Global Alliance for DRR in the education sector, UN partnerships with youth such as TUNZA and YouthXchange; Youth-community partnership such as the Village association of children.

NOT JUST HOT AIR

Putting Climate Change Education into Practice

Climate change is one of the greatest threats to sustainable development. The ten hottest years on record have occurred since 1998. Sea levels are rising; ever more frequent natural disasters, such as cyclones and tropical storms, are threatening people's homes and livelihoods. In its latest report, the Intergovernmental Panel on Climate Change (IPCC) stressed that 'a changing climate creates pervasive risks, but opportunities exist for effective responses.'

Climate Change Education is a powerful tool for developing such responses and helping people address climate change. It helps learners understand the causes and consequences of climate change. It prepares them to live with the impacts of climate change and empowers learners to take appropriate actions to adopt more sustainable lifestyles. Communities can learn about how climate change will affect them, what they can do to protect themselves from negative consequences, and how they can reduce their own climate footprint. In particular, education can help increase the resilience of already vulnerable communities who are the most likely to be adversely affected by climate change.

This publication presents UNESCO's work on Climate Change Education for Sustainable Development in 2012/2013.

