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REPORT & RECOMMENDATIONS

CLIMATE CHANGE EDUCATION FOR SUSTAINABLE DEVELOPMENT IN SMALL ISLAND DEVELOPING STATES



UNESCO EXPERTS MEETING
21-23 SEPTEMBER 2011
NASSAU, COMMONWEALTH OF THE BAHAMAS

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Introduction and background

This report summarizes the key outcomes of a three-day meeting of around one hundred climate change education (CCE) experts, primarily from Small Island Developing States (SIDS) in the Caribbean, the Pacific Ocean and the Indian Ocean, representing a multi-disciplinary and diverse group of stakeholders. The meeting discussed and reflected on the challenges that climate change poses to education systems in SIDS, and on the role that education must play in adaptation to climate change. It was held from 21 to 23 September 2011 in Nassau, with the support of the Commonwealth of the Bahamas, the Government of Denmark and the Government of Japan.

SIDS in the Caribbean Sea, the Indian Ocean and the Pacific Ocean are among the most vulnerable countries with regard to climate change. SIDS are already confronted with the effects of climate change, including rising sea levels and changes in weather and climate extremes such as droughts, floods and tropical cyclones/hurricanes.

With current and future impacts of climate change representing a real danger to SIDS communities and livelihoods – whether based on agriculture, fisheries, forestry, tourism or trade – the need for SIDS to reduce their vulnerability to climate change by strengthening their adaptive capacity is a matter of urgency. Moving further along the path to sustainable development and achieving sustainable development objectives will depend on the ability of SIDS to strengthen this adaptive capacity.

Adaptation to climate change requires individuals to be aware of potential changes in the climate and to understand the implications of changes for their lives. It requires them to assess the risks such changes hold for their identity and future, and to make informed decisions on how to adapt their livelihoods, homes and communities.

Education plays an essential role in increasing the adaptive capacity of communities and nations by enabling individuals to make informed decisions. In particular, the education of girls and women has proven to have a significant impact on the capacity of communities to adapt to climate change and develop sustainably.

Quality education designed for the purpose of empowering people to address climate change and live sustainably improves the adaptation capacity at the community level. This implies educational programmes that explicitly prepare communities for natural disasters. Climate change education for sustainable development (CCESD) needs also to incorporate indigenous knowledge, and promote sustainable lifestyles in which the importance of heritage is recognised as an integral part of community identity and a key asset that can help build resilience. Finally, CCESD should stress the unique cultural and natural heritage of SIDS, which plays a major role in the building of community resilience.

While education is vital for strengthening adaptation capacities, these are also needed to equip education systems and infrastructure to prepare for climate change. Entire school communities – including local education authorities, administrative staff, teachers and parents – must be prepared to ensure a climate-safe school environment. Furthermore, the capacity of education systems to respond to new migration streams caused by climate change – or to the requirement of new skills due to a changing environment – should be considered in the development of education strategies for adaptation to climate change.

Opening session



Davidson Hepburn

The President of the General Conference of UNESCO

'Education plays an essential role in increasing the adaptation capacity of communities and nations with regards to climate change.'

The opening session of the meeting was chaired by Ms. Elma Garraway, the Permanent Secretary of the Ministry of Education of The Bahamas.

Keynote remarks were provided by the Hon. Theresa Moxey-Ingraham, Chair of the UNESCO National Commission of the Bahamas, H.E. Dr. Davidson Hepburn, OBE, President of the General Conference of UNESCO, and Ms. Gretchen Kalonji, Assistant Director-General for Natural Sciences of UNESCO.

The formal opening remarks were followed by a message on the SIDS Rio+20 preparatory process presented by Mrs. Hiroko Morita-Lou, Chief of the SIDS Unit at the UN Department of Economic and Social Affairs.



Desmond Bannister

Minister of Education, The Commonwealth of the Bahamas

'... teachers are the best channels of knowledge in our world and therefore we must equip them with the knowledge and confidence to lead in this global mission... less today means more for the future.'

A video message from Mr. Forest Whitaker, American actor and UNESCO Goodwill Ambassador for Peace and Reconciliation, was played, highlighting the importance of CCE and encouraging participants to help develop solutions and strategies to address climate change in SIDS. Mr. Whitaker's message included a short film on the impact of climate change on communities living in low-lying atolls.

Setting the tone for the discussions to follow, a keynote speech was presented by the Hon. T. Mr. Desmond Bannister, Minister of Education of the Commonwealth of the Bahamas.

Introduction to thematic sessions

Presentations and discussions were organized in a series of thematic sessions, intended to focus the outcome of the experts' meeting on a series of forward-looking recommendations. In turn, these were formulated to inform and underpin work plans, strategies and educational programmes at global, regional, national and local levels.

Designed to capture and reflect priority issues arising from the forty highly diverse and complex presentations, the thematic sessions were:

Panel I Climate change education (CCE), science and research: scientific, socioeconomic, cultural, gender and ethical perspectives in SIDS, serving to present current priorities and trends in climate change-related natural and social science as well as related educational research and thinking, while according specific priority to gender and ethical principles.

Panel II Reducing the impact of natural disasters: education responses to disaster preparedness, coping with disasters and reducing the risk, serving to establish and explore synergies in SIDS-specific approaches to education for DRR and CCE.

Panel III Island heritage and knowledge: foundations of CCE in SIDS, stressing the importance of linking CCE to local and indigenous knowledge, experience and world views; and the reflection of local indigenous knowledge systems with climate science.

Panel IV Targeting the needs of the vulnerable: education programmes and strategies to reach and respond to the adaptation needs of youth, women and local communities, emphasizing the necessity for CCE to prioritize the needs of communities and groups facing particular vulnerabilities to climate change – which are often those not reached by the formal education systems in SIDS.

Panel V Knowledge and skills for adaptation to climate change: prioritizing CCE content in SIDS and identifying the skills needed for adaptation, focusing on the development of SIDS-specific and locally appropriate CCE content, identifying synergies and approaches to knowledge, as well as skills and technology transfers between SIDS regions.

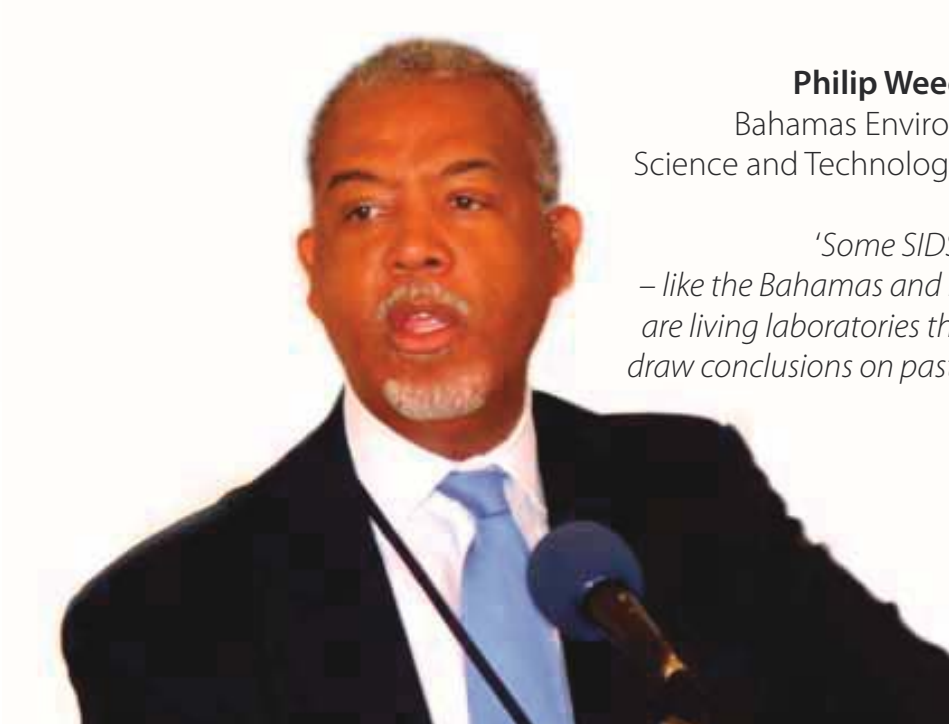
Panel I

Climate change education, science and research: scientific, socioeconomic, cultural, gender and ethical perspectives in SIDS

Summary of presentations

Speakers on the first panel stressed the particular vulnerability of SIDS to climate change, noting that the impacts of climate change will affect SIDS disproportionately hard, given their coastal and often low-lying nature, and very limited contributions to global greenhouse gas emissions. Considering the impact already being felt in SIDS, as well as the experience and knowledge of island societies in living with and adapting to change, SIDS have an essential role to play in setting the global agenda for CCESD.

An emerging SIDS-led agenda must stress the importance of expanding CCE from a purely climate science concern to incorporate the wider social setting. While in the past, technical solutions and behavioural changes were the focus of CCE efforts, there is now a better understanding of the wider social and cultural context. However, knowing the facts alone will not bring



Philip Weech

Bahamas Environment
Science and Technology Commission

*'Some SIDS
– like the Bahamas and its blue holes –
are living laboratories that can help us
draw conclusions on past climatic shifts.'*

about sustainability. Education must take place outside the classroom and promote creative problem solving in – and through engagement with – the local community, emphasizing learning through action and interaction. In this way, the abstract global scenario and its related threats can be effectively linked to real, firsthand experience.

One speaker provided an example of how this linkage between the formal education system and the wider community could be realized via a case study of a programme targeting vulnerable communities in the Melanesian region of the Pacific. Local language educational resources focusing on strengthening food security were produced by a regional NGO in collaboration with ministries of education – encouraging farmers, extension workers and teachers to plan for climate change. These materials – along with supplementary publications on local crops and a leadership manual for community leaders – formed the basis for community training courses and discussions on climate change science and local impacts, as well as adaptation options.

Lorna Innis

Coastal Zone Management Unit,
Barbados

*'Healthy ecosystems
save lives.'*





Gretchen Kalonji
UNESCO

'We should integrate schools and communities into the scientific agenda through contributions to data collection studies.'

Discussion

In the discussion following the formal presentations, participants stressed the necessity of scaling up innovative CCE initiatives. Too many programmes in the past have stressed climate change as an insurmountable threat, thereby generating fear and increasing the likelihood of a negative response. Outside the formal education system, education and training for climate change decision-makers and international negotiators was stressed as a priority need. A number of participants recommended forging a stronger link between the education system and climate science, for example through the involvement of schools in data collection and analysis. Governments were encouraged to support science-education partnerships; considerable synergies could be generated through closer collaboration between schools and scientists.

Recommendations

- **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.**

Zinaida Fadeeva
UNU-IAS

'The blend of education and research is a powerful domain through which to empower SIDS communities.'



- **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.
- 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.

Panel II

Reducing the impact of natural disasters: education responses to disaster preparedness, coping with disasters and reducing the risk



Ilan Kelman

Island Vulnerability

*'There is no need
to separate disaster risk reduction
and climate change work.'*

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Summary of presentations

Like in Panel I, presenters stressed the particular vulnerability of SIDS to climate change. Living in coastal and low-lying areas, the majority of SIDS populations are exposed to climate change related threats, such as sea level rise and increased intensity of extreme weather events. Given the limited land mass of most SIDS, there are few options for relocating populations to more secure areas. SIDS economies are small, often dependent on single sectors, such as tourism, and are largely based in the coastal area where they are also vulnerable to anthropogenic hazards such as oil spills. Disaster risk management has the potential to lessen the impact of disasters through measures including pre-disaster preparedness, immediate and long-term responses, and the implementation of disaster risk reduction (DRR) measures.

Presenters emphasized that measures to mitigate or prepare for disasters are to a large extent the same as those required for climate change adaptation (CCA), and therefore recommended that education for disaster preparedness should be linked to CCE. Such a linkage would mutually reinforce and benefit both areas of concern, and would avoid duplications.

Gillian Cambers

Sandwatch Foundation,
Australia

'If we don't reduce the cause of the problem – our extensive use of fossil fuels – we have failed.'



Discussion

Different audiences such as adults, children, local communities, language groups, etc., require the application of different communication, outreach and education techniques. These include for example art, videos, and social media – depending on the specific context and needs of the target group. According to one speaker, information, education and knowledge must break the cycle of vulnerability.

One speaker mentioned a project in the Philippines supported by Plan International called 'Climate smart disaster risk management' (CSDRM). Based on a child's rights approach CSDRM encourages children to lead actions, making use of the ability of children to grasp concepts such as adaptive capacity, which adults may not even fully appreciate. This approach requires children to develop means of communicating what they learn through the process.

It was noted that DRR efforts must often compete with immediate concerns, such as debt and unemployment. A recommendation seeking to overcome this suggested the pooling of resources from insurance, emergency management and research sectors, with the objective of developing a vulnerability index for SIDS.

One presenter regretted the lack of educational materials on climate change with locally appropriate Caribbean content, in addition to little regional coordination of existing climate change activities in Caribbean schools. Education with a specific regional focus is essential to ensuring relevance, which in turn is required to engage local communities as well as actors at the national level. To improve this situation, a group of NGOs have developed a

regional framework for achieving climate change resilient development. It includes education and awareness-raising strategies for the Caribbean region.

In addition to content and coordination, the physical setting also plays an important role in the development of appropriate educational responses to disasters and to climate change. A programme supported by UNICEF in Guyana pays particular attention to the physical school environment using for example schools as shelters, which is important for early recovery.

Recommendations

- **Link and where possible integrate education for DRR and CCE.** The preparations and actions for DRR are closely related to those needed for CCA. Establishing this link in educational policies and programmes will also allow for the demonstration of the urgency and direct impacts of climate change on SIDS.
- **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.
- **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.
- **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.

Panel III

Island heritage and knowledge: foundations of climate change education in SIDS

Summary of presentations

Speakers recognized the importance of culture in CCE and agreed that CCE must be planned and implemented with the involvement of community members and draw from their local knowledge. In this way, local and indigenous community members are empowered to share their knowledge, often accumulated through generations of observation and analysis.

The relevance of Education for Sustainable Development (ESD) as the overarching frame for CCE was mentioned by several speakers. In this regard, ESD should be understood to include lifelong learning, as well as formal, non-formal and informal education.

Mr. Timote Vaoleti

Waikato University,
New Zealand

'Empathy is the key: We must try to project ourselves into other people, to attain an interconnectedness.'





Sandy Morrison

Waikato University, New Zealand

*'But sustainability is not a new concept for us,
the people of the Pacific!'*

The session emphasized a core principle of ESD – *learning to live together in order to live sustainably* – and stressed the need to engage with traditional ways of learning and knowing in order to bridge science and indigenous knowledge. One speaker explained how a university in New Zealand is working on the interface between indigenous knowledge and the natural sciences. In this context, a matrix has been developed to demonstrate the meaning of Maori (indigenous New Zealand) values. This matrix was then used to explain indigenous values to members of the scientific community, which led to the development of indicators commonly agreed upon by indigenous communities and scientists.



Michael Pateman

Antiquities, Monuments and Museums Corporation, The Bahamas

'We should perhaps not go to communities, scaring them with jargon, but talk in their language, listening to them and to how they have adapted to changes in the past.'

Discussion

In the discussion, participants debated Pacific indigenous community experiences of past climate change events that might serve to illustrate present-day challenges. Some indigenous Pacific cultures disappeared, while others continue to thrive. How did these cultures adapt to past environmental and anthropogenic change? The concept of *guardianship* – anchored within the indigenous Pacific value systems – is key to this process of adaptation.

For the wider global community to benefit from indigenous perspectives and approaches to adaptation, a conscious effort to understand the contextualization of climate change in different communities and cultures is required. However, because climate change is a fairly new concept for many, it is at the same time something that must be explained and understood in the local context. Participants agreed that – as a starting point – listening to the stories of how local and indigenous communities have adapted to environmental change in the past is very important.

Recommendations

- **Take into account the interdisciplinary nature of CCESD**, which is an integral part of 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.
- **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.
- **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.

Panel IV

Targeting the needs of the vulnerable: education programmes and strategies to reach and respond to the adaptation needs of youth, women and local communities

Summary of presentations

Multiple presenters noted the importance of reaching out to children and young people, recognizing the need for an educated youth for an effective response to climate change, which includes the required changes in behaviour. Presenters agreed that effective dissemination of information should be targeted to groups taking into account the audience's age, gender, social and cultural background, etc.

Information and communications technology (ICT) is becoming a powerful tool for making CCE more effective. Social media and other Web 2.0 tools are increasing participatory educational opportunities around the world, and they have the potential to strengthen adaptation. These technological tools appeal to young people, and they allow for more flexibility and innovation in and outside of the classroom.

Several programmes that aim to reach specific groups were presented. These included UNESCO's 'Sandwatch' programme, which is active in over 50 countries, more than half of which are SIDS. Sandwatch seeks to alter the habits of everyone from children to adults on a community-wide basis to develop awareness and adapt to climate change. The programme involves all participants to build ecosystem resilience in their own communities, particularly beaches and other coastal areas. Other initiatives included the 'Voices for climate change education' project, which uses regionally renowned artists as mentors to reach young people. The 'Portraits of resilience' project uses images and media to share stories of climate change from people of all ages. Recognizing that taking care of the environment is a community undertaking, this project brought the entire community together with the result that youth and elders developed respect for each other's points of view. Finally, a new initiative, the 'Island communications toolkit', was presented, designed to generate awareness and behavioural change among the general public and to inspire leaders in SIDS through the use of tools, such as radio drama, online resources and more.

**Celeste Chariandy**

Caribbean Natural Resources
Institute, Trinidad & Tobago

*'Climate change is
a fog of words and figures
which we need to make
understandable to all.'*

Discussion

Participants were supportive of the use of ICT and social media in CCESD. However, there were some concerns that the most at-risk populations do not necessarily have access to the internet, requiring organizations to take care in ensuring that they effectively reach their intended audiences. In addition, participants asked how best to engage the older generations less comfortable with ICT. One recommendation was to use community-based organizations to reach elders.

It was noted that community members often resist discussing 'climate change' as such. However, when the topic is approached through the telling of stories and discussion about changes that have occurred in their communities and immediate surroundings, they are more willing to discuss their observations and experiences regarding the effects of climate change. It was suggested that scientists should capture knowledge transmitted through oral traditions and consider this alongside the data generated through their scientific work.

Recommendations

- **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.



Claire Anterea

Youth Visioning, Kiribati

'Music, drama and dance are powerful means of communication with our communities.'

- **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.
- **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.
- **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.

Panel V

Knowledge and skills for adaptation to climate change: prioritizing CCE content in SIDS and identifying the skills needed for adaptation

Summary of presentations

Speakers noted that building the capacity of teaching personnel and education planners is essential if CCE is to have a long-term impact. A strong future-oriented approach is still missing in existing curricula, educational practice and assessment schemes. Therefore, a re-orientation of teacher education for CCESD is needed, and with it a change in culture. Such a change requires collaboration with teachers from other disciplines, in order to incorporate CCE into their curriculum and anchor their teaching in the community. Teachers need to be accompanied in this process, which puts increased demands on them. The example of teacher mentors – who accompany teachers in the process of taking up new subject areas – was suggested as an effective support mechanism.

One speaker explained how the Cook Islands in the Pacific has been utilizing ICT to assist with education and instruction in its remote outer islands. Teachers have been trained to teach wherever they are needed, and are prepared for rapid deployment; for example, if they need to be relocated to cover a teacher shortage in the aftermath of a natural disaster.

Presenters underlined the importance of ESD as an underlying concept for CCE. ESD supports the transformative nature of education; the development of knowledge, skills and values and a student-centered learning approach. One presenter underlined the importance of linking ESD-related educational reform to assessment. Once again, the utility of linking CCE, DRR and biodiversity education was stressed, with the recommendation that these areas should be reinforced and built into national curricula.

It was recommended that CCE be incorporated into graduate and postgraduate studies, in order to deliver degree programmes that enhance the capacity of those working with climate change. Furthermore, legal frameworks for CCE must be strengthened in SIDS. This, in turn, will require a more systemic approach to influence policy.



Carol Young

The University of Auckland,
New Zealand

'Learning responsibility can only be done through experience.'

Discussion

Some participants took issue with the application of conventional testing methodologies to CCE as this risks the development of a 'teaching for tests' approach, which represents an obstacle to more interactive learning methods. It was also discussed that CCE as a 'regional common good' should be able to generate funds through international funding mechanisms.

Lorna Down

The University of the West Indies, Jamaica

'Reorienting teacher education for CCESD requires a change of culture. A strong futures perspective in the curriculum is missing.'



Recommendations

- **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.

- **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.
- **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.
- **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.
- **Ensure that adaptation funds** are made available to support CCESD, which represents an important strategic dimension of CCA efforts in SIDS.
- **Advocate for CCE 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 2012 meeting 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).

Final recommendations

UNESCO, with support from the governments of Japan, Denmark and the Commonwealth of the Bahamas, organized an Expert meeting on CCESD and Adaptation in SIDS on 21–23 September 2011 in Nassau, the Commonwealth of the Bahamas. The 76 participants from 29 countries adopted the following recommendations on CCESD in SIDS. The recommendations are addressed to UNESCO, Member States, educators and other stakeholders:

- **Take into account the interdisciplinary nature of CCESD**, which is an integral part of 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.
- **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**.
- **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.

- **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.
- **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.
- **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.
- **Link and where possible integrate education for DRR and CCE.** The preparations and actions for DRR are closely related to those needed for CCA. Establishing this link in educational policies and programmes will also allow for the demonstration of the urgency and direct impacts of climate change on SIDS.
- **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.
- **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.

- **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.
- **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.
- **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.
- **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.
- **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.

- **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.
- 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.
- **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.
- **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.

- **Ensure that adaptation funds** are made available to support CCESD, which represents an important strategic dimension of CCA efforts in SIDS.
- **Advocate for CCE 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 2012 meeting 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 CCESD and adaptation in SIDS.

23 September 2011, Nassau, The Commonwealth of the Bahamas

ANNEX I

Agenda



United Nations
Educational, Scientific and
Cultural Organization

Experts Meeting on Climate Change Education for Sustainable Development and Adaptation in Small Island Development States

September 21–23, 2011
Nassau, Commonwealth of the Bahamas

DRAFT AGENDA

DAY 1	
09:00-10:00	Registration
10:00-12:00	Opening session Prelude: Royal Bahamas Police Force Pop Band Chair: Elma Garraway, Permanent Secretary, Ministry of Education National Anthem of the Commonwealth of the Bahamas Opening Prayer: Bahamas Christian Council Opening remarks by: Hon. Theresa Moxey-Ingraham, Chairperson for the National Commission of the Bahamas, UNESCO Bahamas H.E. Dr Davidson Hepburn, OBE, President of the General Conference of UNESCO Gretchen Kalonji, Assistant Director-General for Natural Sciences, UNESCO Selection: Ministry of Education (Bahamas) School Students Message on SIDS Rio+20 preparatory process Hiroko Morita-Lou, Chief, SIDS Unit, UN DESA Video message from Forest Whitaker, UNESCO Goodwill Ambassador for Peace and Reconciliation Keynote speaker: Hon. T. Desmond Bannister, Minister of Education, the Commonwealth of the Bahamas
12:30-14:00	Lunch

	Panel sessions and discussions
14:00-15:45	<p>Part I: Climate change education, science and research: scientific, socio-economic, cultural, gender and ethical perspectives in SIDS</p> <p>Chair: Arthur Rolle, Meteorology Department, The Bahamas</p> <p><i>Bahamas Environment, Science and Technology Commission (title to be confirmed)</i> By Phillip Weech, Bahamas Environment, Science and Technology (BEST) Commission, The Bahamas</p> <p>Coastal Climate Change Adaptation, A SIDS Education Imperative By Lorna Inniss, Deputy Director, Coastal Zone Management Unit, Barbados</p> <p>Inputs from Educational Research and Research on Humans and Environmental Risks By Jeppe Læssøe, International Alliance of Leading Education Institutes, Department of Curriculum Research, School of Education, Aarhus University, Denmark</p> <p>Climate Change Education in the Pacific – The Live & Learn Experience By Doris Susau, Country Manager, Live & Learn Environmental Education, Fiji</p> <p>Climate, Water and Weather Affairs: A Multidisciplinary Approach to Knowledge Transfer By Lino Naranjo, “Climate Affairs” and “El Niño Affairs”, Spain</p> <p>Discussion</p>
15:45-16:15	Coffee break
16:15-18:00	<p>Part I (continued)</p> <p>Partnership in Education for Climate Change in the Pacific By Seema Deo, Secretariat of the Pacific Regional Environment Program (SPREP), Samoa</p> <p>Intersectoral Engagement and Climate Change – Example of the Regional Centres of Expertise on ESD By Zinaida Fadeeva, UNU-IAS, Japan</p> <p>Efforts to Bridge the Gap Between Climate Change Research and Education in Trinidad and Tobago By Keisha Garcia, President, The Cropper Foundation, Trinidad and Tobago</p> <p>Education in the Framework of Article 6 of the United Nations Framework Convention on Climate Change By Adriana Valenzuela, External Consultant on Article 6 for the Dominican Republic Government, Colombia</p> <p><i>Article Six Implementation in the Caribbean (title to be confirmed)</i> By Ulrich Trotz, Director, 5Cs Caribbean Community Climate Change Centre, Belize</p> <p>Empowering Young Minds Towards Environmental Stewardship Through the National Curriculum By Gulfishan Shafeeu, Senior Curriculum Developer, Maldives</p>

DAY 2

09:00-11:00	<p>Part II: Reducing the impact of natural disasters: education responses to disaster preparedness, coping with disasters and reducing the risk</p> <p>Chair: Mark Richmond, Director for the Division of Education for Peace and Sustainable Development, UNESCO</p> <p>Many Strong Voices for Climate Change Education: Examples from Belize and Timor-Leste By Ilan Kelman, Island Vulnerability, Norway</p> <p>Reducing the Impacts of Natural Disasters and Climate Change in Small Island Developing States By Gillian Cambers, Co-Director, Sandwatch Foundation, Australia</p> <p>Caribbean Schools Programme For Climate Resilience By Owen Day, Co-Director, The CARIBSAVE Partnership, UK</p> <p><i>Strengthening Disaster Risk Management Capabilities in SIDS</i> By David Smith, Programme Coordinator, UCSIS, Jamaica</p> <p>Communication on Disaster Risk Reduction and Climate Change By Daniel Stothart, National Disaster Management Adviser – Plan International, Dominican Republic</p> <p>Caribbean Climate Change Risk Atlas: Capacity Building, Education and Awareness-Raising By Murray Simpson, CEO, CARIBSAVE Partnership Regional Headquarters, Barbados</p> <p>Climate Change and Education in Guyana: Contributions from UNICEF By Audrey Michele Rodrigues, Programme Officer, Education, UNICEF, Guyana</p> <p>Discussion</p>
11:00-11:30	<p>Coffee break</p>
11:30-12:45	<p>Part III: Island heritage and knowledge: foundations of climate change education in SIDS</p> <p>Chair: H.E. Davidson Hepburn, President of the General Conference, UNESCO</p> <p>Protecting the Blue Holes of The Bahamas, A Community Based Approach By Michael Pateman, Antiquities, Monuments and Museums Corporation, The Bahamas</p> <p>Kaitiakitanga – Guardianship By Sandra L. Morrison, Associate Dean and Senior Lecturer, Waikato University, New Zealand</p> <p>Views of Climate Change and Education for Sustainable Development in SIDS: Challenges and Possible Solutions (Indigenous Ideal/s) By Timote Masima Vaioleti, Lead Researcher, Kiribati Climate Change & ESD Curriculum Development, Professional Studies in Education, Waikato University, New Zealand</p>

	Discussion
12:45-14:00	Lunch
14:00-15:30	<p>Part IV: Targeting the needs of the vulnerable: education programmes and strategies to reach and respond to the adaptation needs of youth, women, and local communities</p> <p>Chair: Gretchen Kalonji, Assistant Director-General for Science, UNESCO</p> <p>Educated Young People: the Key to Sustainable Development in the Seychelles By Indra Persaud, Senior Lecturer in Environment and Geography, University of Seychelles, Seychelles</p> <p>Targeting the Vulnerable – Education Programmes and Strategies to Reach and Respond to the Adaptation Needs of Youth, Women and Local Communities By Indi McLymont-Lafayette, Regional Director, Community, Media & Environment, Panos Caribbean, Jamaica</p> <p>Formal and Informal Education Strategies for Adaptation in Caribbean SIDS: The Need for a Gendered Approach By Marlene Attzs, The University of West Indies, Trinidad and Tobag</p> <p>Climate Change Adaptation in the Pacific Islands: the ICT Solution By Vilimaka Foliaki, Lecturer, Climate Change/Science Education, University of South Pacific, Fiji</p> <p>Sandwatch: A Grassroots Programme with a Global Reach By Paul Diamond, Co-Director, Sandwatch Foundation, St. Kitts and Nevis</p> <p>Discussion</p>
15:30-16:00	Coffee break
16:00-17:30	<p>Part IV (continued)</p> <p>The Islands Communications Toolkit By Jessica Robbins, Islands Communications Manager, USA David Ainsworth, Information Officer, Secretariat of the Convention on Biological Diversity, United Nations Environment Programme, Canada</p> <p>SIDSnet: The Global Network for Knowledge Sharing and Facilitating Partnerships in SIDS By Elena de Jesus, Associate Sustainable Development Officer, SIDS Unit, UNDESA, Division for Sustainable Development, USA</p> <p>A Cross-Sectoral and Child Rights Based Approach to Climate Change Education By Suchitra Sugar, Consultant, Climate Change and Environment, Education Section Programme Division, UNICEF, USA</p> <p>Portraits of Resilience: Pacific Children By Claire Anterea, Youth Visioning, Fiji</p> <p>Effecting the Citizen's Agenda in Climate Change By Celeste Chariandy, Trinidad Fernandes, CANARI Caribbean Natural Resources Institute, Trinidad and Tobago</p> <p>Discussion</p>

Evening	Public Forum
DAY 3	
09:00-10:30	<p>Part V: Knowledge and skills for adaptation to climate change: prioritizing CCE content in SIDS and identifying the skills needed for adaptation</p> <p>Chair: Kwame Boafo, Director, UNESCO Kingston Office</p> <p>Raising Teacher Capacity – Challenges and Scaffolds By Carol Young, Team Solutions, The University of Auckland, New Zealand</p> <p>Teacher Education and Climate Change Education for Sustainable Development By Lorna Down, School of Education, The University of the West Indies, Jamaica</p> <p>Integrating Climate Change into the Formal School Curriculum: the Mauritius Experience By Chandrashekhar Padaruth, Senior Lecturer and Head, Social Studies Department, Mauritius Institute of Education, Mauritius</p> <p>Climate Change Education in the Context of Education for Sustainable Development: A Case Study By Ravhee Bholah, Senior Lecturer, Science Education Department, Mauritius Institute of Education, Mauritius</p> <p>Quality Science Education: A Must for Learning about Climate Change Emma Näslund-Hadley, Senior Education Specialist, Inter-American Development Bank, Washington DC</p> <p>Discussion</p>
10:30-10:50	Coffee break
10:50-12:30	<p>Part V (continued)</p> <p>A Systems-Based Approach to Transform Climate Education in the U.S. Affiliated Pacific Islands (USAPI) By Art Sussman, Senior Program Director, WestEd Co-PI Pacific Islands Climate Education Partnership, USA</p> <p>UCSIS: Development of a SIDS Interregional Sustainability Masters Programme <i>(title to be confirmed)</i> By UCSIS representative <i>(presenter to be confirmed)</i></p> <p>Rainwater harvesting in the Seychelles – short film presentation By Jeanette Larue, Director General, Public Education and Community Outreach Division, Department of Environment, Seychelles</p> <p>When the Mangoes Have Gone By Gail Townsend, CEO, Planning, Policy and Review, Ministry of Education, Cook Islands</p> <p>Climate for Classrooms By Peter Fell, Senior Education Specialist, British Council, UK</p> <p>Discussion</p>

12:30-14:00	Lunch
14:00-15:30	Part VI: Discussion and approval of recommendations Chair: Mark Richmond
15:30-16:00	Coffee break
16:00-17:00	Closing session Closing remarks by H.E. Dr Davidson Hepburn, OBE, President of the General Conference of UNESCO
Evening	Cultural Event hosted by Ministry of Youth, Sports and Culture

ANNEX II

List of participants

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Cable Bahamas
Department of Physical Planning
Environmental Health Services
Marine Mammal Research Group
Ministry of Agriculture and Fisheries
Ministry of Health
Ministry of Housing
Ministry of Tourism
Ministry of Works
Ministry of Youth, Sports and Culture
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ANNEX III

Abstracts of presentations

Panel I

**Climate change education, science and research:
scientific, socioeconomic, cultural, gender and
ethical perspectives in SIDS**

Coastal CCA: a SIDS education imperative

Lorna Inniss

While the social and economic status and quality of life of island residents is influenced by the coastal zone, a significant percentage of island populations remain unaware of the impact of their own decisions and actions on this dynamic but vulnerable area. Indeed, many recognize the significant negative changes to the coast during their generation, yet remain unaware that those changes are driven by both climate and human factors.

This presentation demonstrates the process of development of a coastal CCA education module that presents phases of the new coastal climate change paradigm and the possible adaptation measures that may be utilized within SIDS. The first phase incorporates the concept of coastal planning and development control that prevents the inappropriate siting of coastal infrastructure, with two positive results: (1) adequate setbacks and control of discharges removes the human stressors from an already weakened coastal system; and (2) the setbacks also reduce the vulnerability of the same infrastructure and inhabitants to increasing intensity of sea level-related hazards. A concurrent phase ensures the protection of the five natural lines of defense against coastal hazards – barrier reefs, fringing reefs, sea grass beds and coral rubble, beaches and dunes, and mangrove wetlands. The final phase recognizes that the accelerated coastal climate change may challenge the ability of SIDS to ‘keep up’ by conservation and coastal planning alone. Or, in some cases, there may be a catastrophic failure of planning policies and conservation efforts. These situations call for artificial shoreline stabilization measures by SIDS that are costly, and if not well-designed, could exacerbate coastal risks.

Inputs from educational research, and research on humans and environmental risks

Jeppe Læssøe

CCE is still in its early making but important lessons can be drawn from research in related educational fields, such as environmental education and ESD, as well as from environmental psychology and environmental sociology. While the last two disciplines can help us to understand how people think, feel, act and interact with other people on risks like climate change, research on environmental education and ESD can help to understand what is needed to promote civic participation, and facilitate learning and problem solving.

This presentation briefly introduces some key points from these research fields and, especially, some recommendations from an international study 'Climate change and sustainable development: the response from education'. The points and recommendations are related to the CCA challenges of SIDS and structured in three parts: (1) approaches to CCE, (2) needs and promising practices at the policy and organizational levels, and (3) key principles for educational practices in schools and communities

CCE in the Pacific: the Live & Learn experience

Doris Susau

Live & Learn Pacific covers four island countries in Melanesia – Fiji, Papua New Guinea, Vanuatu and the Solomon Islands. With each country surrounded by the Pacific Ocean, there is rich diversity in both flora and fauna, on land and at sea. This requires the custodians of these abundant resources to be supported to work with a range of issues that impact on the sustainable development of their island homes. Live & Learn is committed to working with communities to develop an ethic of environmental and development education, which starts with local knowledge and a global understanding of development issues.

The goal of Live & Learn's climate change programme is to heighten climate change awareness, advocacy, community mobilization and adaptation planning. Establishing understanding of development issues such as CCESD and adaptation is key to mobilizing and supporting communities to act for change. Action based, effective and creative learning models and teaching methodologies have been established. Linking schools, schools management and teachers with communities, chiefs, elders, parents and other agencies is central to our involvement with communities in their entirety for environmental and development education.

Live & Learn uses the rapid assessment of perceptions (RAP) as a means for obtaining information and data for the analysis of the main factors and variables in the community, towards CCA and sustainable development. The RAP informs (1) resource development (2) training content, and (3) monitoring and evaluation processes and most importantly enhances understanding among project staff of communities, perceptions towards their rights and opportunities to participate in community development. RAPs emphasize the collection of population or community-based information; then examine the relevance of a range of social, cultural, economic and political factors that might influence an issue.

Climate, water and weather Affairs: a multidisciplinary approach to knowledge transfer

Michael Glantz and Lino Naranjo

Climate Affairs is designed to institutionalize in an explicit way the multidisciplinary necessity for knowledge dissemination about the consequences of the interplay among climate, environment and society. Here, climate refers to seasonal, inter-annual variability, change and extreme hydro-meteorological events. The 'Climate Affairs template' encompasses climate, water and weather *science, impacts, politics, policy and law, economics, and ethics and equity*. It provides a unique model and opportunity to develop a new set of climate-related programmes for students of any age and at any level of education, as well as for professionals interested or engaged in climate, water and weather sensitive decision-making processes.

The 'affairs' template has also been used to educate and train decision makers in civil defense and in other climate-sensitive sectors of society in Mexico about the impacts of El Niño on ecosystems and on societies, for example, El Niño Affairs. A special aspect of Climate Affairs is an non-traditional approach to sharing climate, water and weather related knowledge called 'SpareTime University'. This approach complements the traditional, more formal university education and training activities that focus primarily on undergraduate and postgraduate students.

Partnerships in education for climate change in the Pacific

Seema Deo

This presentation provides an overview of the work of the Secretariat of the Pacific Regional Environment Programme (SPREP). It reviews climate change challenges in the Pacific region and looks at policies, as well as education approaches. It also presents regional partners in CCE and explains how the regional CCE framework serves as a coordinating mechanism.

Intersectoral engagement and climate change – example of regional centres of expertise (RCEs) on ESD

Zinaida Fadeeva

Long-term, integrated, cross-sectoral, participatory learning and actions at the regional level are seen as key strategies for up-scaling climate adaptation and mitigation efforts. To be successful, such actions require a long-term perspective, a balance of priorities of various groups and sectors, an understanding of their roles, and the development of partnerships and communities of practice.

With their ability to bring together multiple stakeholders from the knowledge sector, the RCEs on ESD, which the United Nations University has taken the lead to develop since 2003, are in a position to facilitate challenges in the management of climate change planning at the regional level, including gaps in knowledge sharing and lack of expertise. RCEs could become hubs for learning, capacity development and coordination of climate change management efforts in addressing sustainability both locally and internationally. Today, 88 RCEs operate in Europe, the Americas, Asia and Africa.

Efforts at bridging the gap between climate change research and education in Trinidad and Tobago

Keisha Garcia, Omar Mohammed, Maurice Rawlins

Trinidad and Tobago (T&T), like other SIDS around the world, faces the growing threats posed by a changing climate. With an economy that is heavily dependent on petrochemicals, and with one of the most rapid rates of development in Latin America and the Caribbean, there is an urgent need to place greater emphasis on developing and more effectively incorporating CCE into all sectors, in order to increase the nation's adaptive capacity.

The preliminary findings of a gap analysis on ESD in T&T have highlighted that, although there have been (and continue to be) several activities aimed at raising awareness about climate change both with and outside the formal school system, significantly more is required to have a positive impact on the attitudes and behaviours of T&T citizens. The gap analysis therefore recommends, *inter alia*, the development of a robust, research framework to better inform ESD (including CCE), which utilizes a multi-sectoral and multi-stakeholder approach. It also points to the need to strengthen relationships between and among all relevant stakeholders, in order to ensure that climate change data and information are effectively incorporated into national and sectoral strategies, policies, plans, programmes and projects.

This presentation focuses on some of the specific findings arising from the gap analysis with respect to CCE in T&T. It highlights how a civic society organization located in T&T, The Cropper Foundation, and The University of the West Indies (UWI) have been partnering on a number of initiatives to help bridge some of the existing gaps between climate change research and education in the country. Particular emphasis is placed on the role and involvement of young people and students, given that the youth are considered important stakeholders in climate change adaptation efforts.

Education in the framework of Article 6 of the United Nations Convention on Climate Change (UNFCCC)

Adriana Valenzuela

This presentation focuses on Article 6 of the UNFCCC, which addresses the issue of climate change related education, training and public awareness. The implementation of all elements of Article 6 of the convention, including education, training, public awareness, public participation, public access to information and international cooperation are fundamental in order to promote a cultural change for transforming lifestyles, consumption and production patterns sustainably.

To address Article 6, the Parties adopted in November 2002 the New Delhi work programme on Article 6 of the convention (decision 11/CP.8) and in December 2007 the Parties adopted the amended New Delhi work programme (ANDWP, decision 9/CP.13). This programme serves as a flexible framework for country-driven actions to address the specific needs and circumstances of the Parties. The ANDWP recommends promoting and developing education and training programmes focused on climate change, targeting youth in particular, including exchange or secondment of personnel to train experts. The programme also highlights the importance of enhancing the inclusion of climate change in school curricula at all levels and across disciplines, developing materials and promoting teacher training. In 2010, the UNFCCC Secretariat developed the intermediate review on the implementation of the ANDWP and the final review is programmed for 2012.

This document briefly presents background to Article 6, describes some barriers and needs for the implementation of educational activities identified in the intermediate review of the ANDWP, and provides some recommendations for CCE. Finally it highlights the opportunities for connecting educational efforts with the upcoming activities in the framework of the UNFCCC, especially the actions for the preparation of the new work programme on Article 6 of the convention.

Article 6 implementation in the Caribbean

Ulrich Trotz

The UNFCCC, through its Article 6, and the Kyoto Protocol, through its Article 10, call on governments to educate, empower and engage all stakeholders and major groups on policies relating to climate change. In particular, Article 6, which addresses the issue of climate change related education, training and public awareness, is the main vehicle by means of which the convention fosters

action to develop and implement educational and training programmes on climate change.

In the Caribbean, we have developed a regional public education and outreach strategy, which identifies a range of stakeholders with specific interests and needs – policy makers, media, youth, civil society and faith based organizations etc. The strategy emphasizes the need to develop specific messages for each interest group and to devise effective tools communicating each message. One critical target group is Caribbean youth. At the formal level some initiatives are taking place to introduce climate change issues in school curricula. The approach is to insinuate climate change issues in already existent curricula rather than develop a new subject area – e.g. renewable energy topics under physics, ocean acidification under pH in chemistry, carbon sequestration when discussing biology. However, these initiatives are still *ad hoc*, and require serious discussions with the Caribbean Examinations Council (CXC) regarding curriculum adjustment.

There are many opportunities to introduce climate change to youths through activity based learning. School gardens for instance can start to inculcate in young people the practice of, for example, organic farming, composting, drip irrigation, low-till agriculture, and mulch cultivation all of which are going to be required for farming in a changing climate in the Caribbean. Our technical schools need to be preparing our youth for the green jobs, which should accrue as a result of the implementation of the regional low carbon development pathway enunciated in our regional strategy for building climate resilience. Getting youths involved in activities such as carrying out energy audits on their school; implementing energy and water conservation, waste recycling, composting, calculating their carbon footprint; and, participating in community tree-planting schemes provides a platform for behavioural change, required for climate resilience in the Caribbean.

Empowering young minds towards environmental stewardship through the national curriculum

Gulfishan Shafeeu

The presentation provides an insight into various issues in different sectors relating to climate change and sustainable development in Maldives. The presentation also highlights how the national adaptation programme of action (NAPA) addresses these issues in the country. Following from the conceptual framework of NAPA on the relationship between sustainability and adaptation to climate change, the presentation looks into the adaptation needs identified by eight different priority sectors (land, beach and human settlements; critical infrastructure; tourism; fisheries; human health; water resources; agriculture and food security; and, coastal reef biodiversity), and the steps taken to mitigate the vulnerabilities relating to climate change.

Finally, the presentation concludes with concise information on how the formal curriculum, especially the national curriculum reform movement, aligns with the knowledge and experience from various sources in shaping young minds. The young generations are then in a much better position, in terms of knowledge, skills, values and attitudes, to become environmental stewards of our country.

ANNEX III

Abstracts of presentations

Panel II

**Reducing the impact of natural disasters:
education responses to disaster preparedness,
coping with disasters and reducing the risk**

Many Strong Voices for CCE: examples from Belize and Timor-Leste

Ian Kelman

The Many Strong Voices programme (www.manystrongvoices.org) brings together SIDS and Arctic peoples to deal with climate change on their own terms, especially at the community level. Techniques from Risk Reduction Education for Disasters (Risk RED; www.riskred.org) are contributing to addressing all aspects of climate change in the context of sustainable development. Two brief examples are given here of education-related collaborations on two SIDS from different regions: (1) working with fishing communities in Belize to understand perceived and actual environmental changes and to support them dealing with the situation; and (2) educating for improved science-based policy through better connecting CCA to DRR in Timor-Leste. The case studies demonstrate how much SIDS experience could teach the rest of the world.

Reducing the impacts of natural disasters and climate change in SIDS

Gillian Cambers

In many parts of the world it is usually the most vulnerable groups who are most at risk from extreme events. Reducing their risk requires first of all an understanding of the impacts of natural disasters and climate change. Combining science with local and indigenous knowledge is important so that people living in SIDS can appreciate the nature, magnitude and likelihood of the change. Reliable and robust scientific information is necessary for effective action to cope with natural disasters and climate change. Explaining to a land owner the need to build a house a short distance away from a dynamic beach (rather than directly on the beach) requires knowledge about how the beach has changed in the past and how it is projected to change in the future. This requires understanding the nature of rapid-onset extreme events, such as tropical cyclones, extreme waves and storm surges, as well as slow-onset climate changes such as sea-level rise and ocean acidification.

For many SIDS the anticipated changes in climate (atmosphere and oceans) for 2020–2040 are likely to be small. Nevertheless there is widespread recognition in small island regions that now is the time to lay the groundwork for future more significant climate change through innovative education activities and linking up with ongoing regional efforts to integrate disaster risk management and CCA. While Intergovernmental Panel on Climate Change (IPCC) assessment reports provide information on the latest science behind climate change, the precise impact of these changes in the short, medium and long-term is little

understood particularly at the scale of individual small islands. For example decades of monitoring beach changes in small Caribbean islands has shown the inherent difficulties of understanding present changes, let alone those likely to happen in the future. However, it is important to use lessons from the past in responding to issues of today.

Caribbean schools programme for climate resilience

Owen Day, Leighton Naraine and Phillip de Silva

This presentation outlines the framework of a new concept for an interactive programme for Caribbean secondary schools focusing on climate change, ecosystems and people. The project is developing and implementing a regional educational programme, aimed at increasing understanding and awareness of communities' and ecosystem vulnerabilities to projected climate change impacts, and the opportunities for adaptation and resilience. The project is establishing a multi-disciplinary team of scientists and educators to develop relevant content and structure, for incorporation into a range of innovative and interactive educational products. The project team is working closely with the Caribbean Examinations Council (CXC) to ensure that the Caribbean Advanced Proficiency Examinations (CAPE) syllabus in environmental science is adapted to reflect the growing relevance of climate science to the region's economic and environmental sustainability. The project focuses on information that is relevant to livelihoods and communities, and on the opportunities for adaptation, mitigation and building resilience. A scholarship and incentives programme is being developed to encourage Caribbean students and teachers to engage with the project, and contribute to the educational content and the initiative's sustainability.

Strengthening disaster risk-management capabilities in SIDS

David C. Smith

The presentation outlines the natural hazards affecting SIDS, which include volcanoes, earthquakes, tsunamis, tropical cyclones, drought, heavy rains, shipping accidents and oil spills. One of the problems that affects SIDS particularly is that they have a large coastal zone relative to their size, and the majority of hazards they are subject to affect the coastal zone. Most SIDS are threatened by sea-level rise and, in the last decade, SIDS suffered loss of life and relocation of livelihoods from natural events, such as hurricane Ivan, which caused an impact of 180% GDP in Grenada, and cyclone Heta, which caused an impact of 800% GDP in Niue.

Generally, SIDS are located in hazardous areas and the majority of SIDS populations and infrastructure are exposed to hazards. Their health and transportation infrastructure is located near the coast or in flood plains, and their small size limits options for the relocation of island populations. SIDS populations are also often vulnerable to hazards because of poverty, high debt to GDP ratios or governance mechanisms that are overwhelmed by these events. Often the main economic activities are carried out in the coastal zone thus increasing their exposure to hazards.

However, despite the frequent occurrence of hazards it is possible to reduce the disaster risk in SIDS. Actions taken include the Caribbean Risk Insurance Facility established in 2007. This fund is designed to meet short-term financial needs of Caribbean governments after hurricanes and earthquakes by providing a quick financial pay-out based on risk models.

Plan International communication on climate change and DRR

Daniel Stothart

The presentation looks at the communication aspect of public education, both with children and adults. For this purpose, a video demonstrating some of the communication techniques Plan has used is shown, followed by a short presentation on the role of children in communicating on climate change, mainly drawing from examples in the Philippines.

Caribbean Climate Change Risk Atlas: capacity building, education and awareness-raising

S. Murray

The CARIBSAVE Climate Change Risk Atlas (CCCRA) is an evidence-based approach to increasing resilience and building capacity to address the challenges of climate change. The CCCRA uses a sectoral approach to examine vulnerabilities and adaptive capacities of multifarious socioeconomic sectors and systems in fifteen countries in the Caribbean. These syntheses of data, information and capacities supports the development of pragmatic *strategies for action* (for governments, the private sector and communities) to build resilience to adverse climate change impacts, exploit opportunities and ensure sustainable development goals are met. Some of the most important practical strategies and programme activities involved in the CCCRA are education interventions (at multiple levels), awareness-raising, and capacity building in communities and institutions. This presentation provides pragmatic examples of selected activities and strategies in this critical area, for dealing with climate change and its impacts.

Climate change and education in Guyana: contributions from UNICEF Guyana

Audrey Michele Rodrigues

Climate change and its myriad of related/resultant geophysical and atmospheric phenomena is the chief latent hazard affecting Guyana. Many of its potential hazard events (floods, drought, forest fires) affect mothers and young children disproportionately more acutely and over a longer period than other sections of the population. With approximately 90% of the population occupying the coastal plain, sea level rise, floods and salt-water intrusion are not only the hazards of interest to this gathering, but also pose the greatest risk nationally. Facilities catering to child care and development are often most susceptible to the effects of environmental hazards. For example, playschools and nursery schools are often located on ground floors of buildings – a major issue on the coastal plain of Guyana, which lies at an average of five feet below sea level at high tides and where most areas are empoldered. Breaches to or malfunctioning of defense works easily flood these areas. Schools are also the first choice for shelter locations, breaking the education regime and developed daily patterns/cycles of children. Additionally, while social and developmental factors affecting young children are intensely studied and well known, environmental hazards are often overlooked and underappreciated. Thus, developmental planners and care givers are often un- or under-prepared to deal with them and at times, in the case of slowly developing phenomena, unaware of the growing occurrence.

Since 2005, UNICEF Guyana has been supporting efforts to address climate and environmental change. This presentation details UNICEF Guyana's support for adaptation and mitigation to climate change, with emphasis on the education system, beginning with the early childhood programmes thus emphasizing a life-cycle approach to solutions. It details adaptation and mitigation measures taken at policy level and in particular for early childhood development; capacity building for children, parents and teachers through school clubs; revision of curricula for the infusion of adaptation and mitigation measures to climate change; capacity building in emergencies; communication campaigns with DVDs development for nursery, primary and secondary school.

ANNEX III

Abstracts of presentations

Panel III

**Island heritage and knowledge:
foundations of CCE in SIDS**

Integrating communities in the sustainable protection of important resources: a case study of the Bahamas blue holes.

Michael Pateman

The long term goal of this study is to evaluate how local/community based knowledge and scientific knowledge can be integrated for the sustainable protection of important resources, using a case study of the blue holes of the Bahamas. This study is conducted as part of a larger projected funded by National Geographic and The Antiquities, Monuments and Museums Corporation of The Bahamas. The goals of this expedition are to study issues of climate change, biology, paleontology, archaeology, water resource management, outreach and education in the blue holes. This presentation specifically addresses the ways in which the project integrated members of the community, in the development of education for sustainable development programmes focusing upon the protection of blue holes of the Bahamas.

Kaitiakitanga – guardianship

Sandra L. Morrison

The Māori concept of *Kaitiakitanga* (guardianship) is integral to Māori identity and culture. *Kaitiakitanga* is the negotiated relationship that Māori have with their environment. Its desired outcome is for the sustainability of the people, their identity, their culture as well as the sustainability of the environmental resource. Within this concept is a depth of traditional knowledge and practice, which has been transmitted and tested over many generations. The IPCC (2007) reports that the capacity of Māori communities to respond to the threats of climate change vary greatly and are limited by funds, human capital and access to information – especially in remote and rural areas of New Zealand, where there are large populations of Māori. Increased risks of extreme weather compound their vulnerability.

This presentation examines and calls for the inclusion of indigenous knowledge into education systems, to mitigate and adapt to climate change. It outlines the challenges that Māori face including spiritual and cultural impacts. Māori are future focused and arriving at creative solutions to ensure that their communities' knowledge is preserved and promoted, and will ultimately sustain their communities to face these issues.

Views of climate change and education for sustainable development in SIDS: challenges and possible solutions (indigenous ideals)

Timote Masima Vaioleti

The goal of education according to Tongan community leader Ned Cook is harmony, peace and balanced existence achieved as a result of development and sustainable relationships with each other, the environment and god. Harmony is achieved by sustainable service guided by an old Pacific philosophy known in Tonga as *tauhi vaa* (other SIDS have their own variations). A gap between *tauhi vaa* and the profit of economically driven developments that lead to climate change is raised by Thaman, who highlights major differences in Pacific educational aims, stating that there is a focus on social and moral aspects of learning and the utilization of such capabilities for the common good, rather than a sole focus on individual advancement.

In this paper, I address how people in SIDS, in particular Tonga and to a smaller extent other Pacific nations, view climate change, sustainable development and the barriers to them. I also present Manulua, an ancient symbolism seen in *ngatu* (tapa cloth), tattoo, art, carving and others, as a new but old Pacific holistic and indigenous framework guiding a social, spiritual, moral and economic education or development that is more coherent, balanced and includes local indigenous culture, context and wisdom. I also suggest ways in which both formal and informal education can support CCE and ESD in their geographical, economic and cultural context.

ANNEX III

Abstracts of presentations

Panel IV

**Targeting the needs of the vulnerable:
education programmes and strategies to reach and
respond to the adaptation needs of youth,
women and local communities**

Educated young people: the key to sustainable development in Seychelles

Indra Persaud and Jeannette Larue

From as early as 1990 Seychelles adopted a national strategy for sustainable development (referred to as the EMPS 90), which included specific priorities for 'environmental information, education and training'. From these humble beginnings, Seychelles has cemented its commitment to ESD by introducing compulsory environmental education modules for all teacher trainees and units on climate change for both primary and secondary school students. More recently this commitment has taken a step further, as the newly established University of Seychelles is about to offer an indigenous, SIDS specific 'Environment and sustainable development' BSc degree tailored to the needs of our unique marine, coastal and terrestrial environments. This new opportunity provides our determined young people with an important educational pathway toward building resilience and adaptive strategies for coping with climate change. The presentation focuses on CCE at primary, secondary and tertiary level, with particular focus on a rainwater harvesting project. It also touches on educational projects carried out by communities and NGOs.

Targeting the vulnerable – education programmes and strategies to reach and respond to the adaptation needs of youth, women and local communities

Indi Mclymont-Lafayette

This presentation highlights work being done by Panos Caribbean and the National Environmental Education Committee in Jamaica, under a pioneering project called Voices for CCE – a national public education strategy. The activities undertaken under this project have educated the population on climate change issues, especially adaptation strategies that will reduce the economic and social impacts of climate change on the country. The project targets 'grass roots' people, sector leaders, and the artistic community. A strategic part of the project is the use of popular artists to reach a large sector of society that would not otherwise relate or respond to traditional media. Artists were educated on climate change, giving them the material to produce a national climate change theme song, as well as another five environment songs, on a mini-album being circulated in Jamaica. The artists have reached at least 7000 persons in five vulnerable communities, over 8000 young people in four school tours and almost 1.5 million persons through media exposure.

A targeted approach has been developed to start dialogue with government decision-makers and key sectors particularly vulnerable to climate change

(tourism, insurance, agriculture etc), so that Jamaica can have a cohesive approach to CCA. In two of the local communities targeted – Mocho and Portland Cottage in Clarendon, women have been instrumental in driving adaptation action on the ground. Particular attention has been paid to replanting trees and mangrove in the two communities respectively. Lessons learnt from this project have been shared in St Lucia, Trinidad and several other Caribbean countries, as well as internationally.

Formal and informal education strategies for adaptation in Caribbean SIDS: the need for a gendered approach

Marlene Attzs

Climate change is likely to exacerbate the impact of natural hazards (particularly windstorm events) in the Caribbean. It also is estimated that climate change will affect the most vulnerable in our countries and might pose the ‘greatest threat’ to sustainable development in the region. The threat posed arises from the regional dependence on the tourism sector, as the primary economic activity for many of the already economically and socially vulnerable islands. Public education is considered a key element of the adaptation process since, without a coalition of learned and informed members of society, a national or regional effort at CCA might amount to naught.

Gillis et al. defined education as ‘all forms of human learning’. The presentation highlights that formal and informal types education are necessary elements to adapt to the impacts of climate change – social, economic and environmental. Education is particularly important among vulnerable groups – women, children and the poor. In Caribbean countries, where there are a disproportionate number of female-headed households and where women dominate employment in the services sector, including the tourism industry, it is important to ensure that education in the context of climate change takes into account the regional gender realities.

CCA in the Pacific islands: the ICT solution

Vilmaka Foliaki

Effective climate change curriculum initiatives in the Pacific are being challenged by many factors, the most important being the real dependence of most Pacific education systems on overseas assistance. With regard to these challenges, there are some important questions that need to be asked: (1) Can the Pacific islands combat climate change on their own? (2) How can Pacific islands curriculum efforts to combat the effects of climate change be made

sustainable beyond the aid projects' budget? The threats of climate change are too great for Pacific island nations to ignore the assistance and funding from partners such as overseas countries, companies and the industries.

ICT can offer a means for Pacific islands to effectively and sustainably deliver their mitigation and adaptation initiatives. In the context of climate change, technology is often perceived in a negative light. Pacific islands can harness the transformative potentials of ICT to improve their CCE efforts. Access to a computer with an internet connection in the Pacific islands is improving yearly, not only by affordable broadband and wireless technologies and mobile phones, but also by the proliferation of interactive and free web-based tools.

This presentation discusses ways in which ICT can be used by education systems in the Pacific islands to improve their existing CCA and mitigation initiatives; and to promote a proactive CCE culture, sustained by a willingness to engage and participate, and values an individual's independence as well as the importance of collaboration, networking and positive interdependence.

Sandwatch: a grassroots programme with a global reach

Paul Diamond

This presentation provides a brief background and history of the Sandwatch project, as well as an outline of its global reach. The Sandwatch methodology is presented in outline, demonstrating the MAST approach – monitoring, analyzing, sharing and taking action. Examples and details of Sandwatch success stories from different regions are shown, followed by an update on the most recent Sandwatch developments, including the publication of the new Sandwatch manual in multiple languages, the redesign and launch of the new Sandwatch website, and the ongoing work to develop a global Sandwatch database. Finally, new Sandwatch initiatives in West Africa and the Pacific are presented, and copies of the latest *The Sandwatcher* newsletter – featuring news from Sandwatch teams in 20 countries – are made available.

The islands communications toolkit

Jessica Robbins and David Ainsworth

Islands are especially vulnerable to the impacts of climate change. Their ecosystems and communities will experience its impacts first and fastest. While islands – both island countries and countries with islands – are unique culturally, environmentally and economically, they have common development challenges. They also share this dilemma: although they are among the world's

most vulnerable populations, their small populations and economies mean that they are largely ignored on the global stage.

The overall goal of the islands communications toolkit is to demonstrate how strategic communications can be used to:

- Create awareness and stimulate behaviour change in the general public;
- Inspire leaders to commitment to action for island conservation and sustainable livelihoods; and
- Create global awareness of climate change and biodiversity loss on islands.

The toolkit is complemented by examples from islands for islands to promote sharing of best practices on the green (and blue) economy, climate change, conservation of biodiversity and sustainable development.

SIDSnet: the global network for knowledge sharing and facilitating partnerships in SIDS

Elena de Jesus

The SIDS network (SIDSnet), which has served as a resource and tool for information sharing for SIDS since 1997, is being revitalized as part of the larger project 'Capacity development through education for sustainable development and knowledge management in SIDS'. SIDSnet is being transformed from an information website to a knowledge management platform, with a focus on decentralized content management and stakeholder engagement. The aims of SIDSnet are: to track international meetings related to SIDS through a partnership with the International Institute for Sustainable Development; to contribute to filling in gaps in data availability on sustainable development in SIDS; and, to facilitate partnerships and motivate action in support of the sustainable development of SIDS.

This presentation hopes to raise awareness of the revitalization of SIDSnet and its goals, to demonstrate its new features, and to provide a 'call to action' inviting stakeholders to be involved and steer ongoing development according to their needs as users of the platform.

A cross-sectoral and child rights based approach to CCE

Suchitra Sugar

A focus on child rights and equity brings together the many disparate threads regarding climate change and education under a comprehensive, holistic and

cross-sectoral framework. This approach through the education sector provides stronger, more effective results than the sum of results provided by multiple single sector interventions – contributing to the achievement of child rights and equity in the context of climate change. UNICEF has developed resources to guide countries in mainstreaming CCA and DRR within the education sector through a child rights and equity based approach. The UNICEF country programme in Nigeria provides an excellent example of a cross-sectoral and inter-agency approach. The UN offices in the country have recently received CCA funding for a proposal which includes UNICEF and the education sector working together with UNIDO and the agriculture sector on school gardens.

Portraits of resilience: Pacific children

Claire Anterea

Portraits of resilience illustrates in a direct and personal way the ethical dimension of climate change. The project trains children in regions most affected by climate change in the use of photography and other digital media, helping to bring personal stories and faces to the attention of the general public and to decision-makers at international climate change negotiations. It is important that the world be able to see not only effects of climate change, but the efforts people are making to both combat and adapt to it.

As part of the Portraits of resilience project and with photographer Christine Germano, we mobilized the youth in villages across South Tarawa, in Kiribati, over a period of three weeks to collect their voices and perspectives on climate change. We travelled along South Tarawa asking children to identify how they and their families are affected by climate change.

Since 2005, I have worked with the youth on Kiribati, both on the main island and on isolated remote islands, in an effort to learn from and listen to the experiences of the youth. In this presentation some of the most important lessons learnt from this work are highlighted, to share the powerful ways youth can contribute to working with climate change and how we can learn from their valuable experiences.

Effecting the citizen's agenda in climate change

Celeste Chariandy

The Caribbean Natural Resources Institute (CANARI) has initiated programmes in the Caribbean islands to assist vulnerable communities in developing their CCA capacity. Central to these efforts is a communication strategy, which

enables the transfer of pertinent and critical scientific information to diverse audiences. There is an apparent disconnect in understanding the links between climate change causes and impacts, on people and their environment. This is being addressed by CANARI through a variety of initiatives that seek to break down complex science into understandable concepts related to everyday life, as well as to capture the traditional and local knowledge of communities. This is building knowledge on what climate changes are actually taking place in the Caribbean islands, what impacts these have on the natural resources (forests, coastal and marine resources), and what are the resulting impacts on rural livelihoods who are heavily dependent on natural resources.

Through a combined approach with communication, capacity building and action research and learning, CANARI engages people and focuses on their livelihoods for pertinent actions to reduce vulnerability and build resilience. CANARI proposes to establish an action learning and research group of persons and organizations undertaking climate change communication work in the Caribbean islands. The establishment of this network enables the gaining and sharing of knowledge and expertise for successful interventions.

ANNEX III

Abstracts of presentations

Panel V

**Knowledge and skills for adaptation to climate change:
prioritizing CCE content in SIDS and identifying
the skills needed for adaptation**

Raising teacher capacity – challenges and scaffolds

Carol Young

The *Seread* programme focuses primarily on the science of climate change – the why and how. Discussions with teachers and other personnel, as well as experiences in New Zealand have led to the understanding of the wider social implications and the need to include these in the programme.

The impacts of climate change in SIDS require students to be educated with the capability to be critical thinkers, resilient, problem solvers, responsible for their own actions and prepared to support their community. These capabilities are harder to teach than subject content. Scaffolding teachers and showing them different strategies to develop these capabilities has a greater focus in workshops.

International research has a consistent message – changing teacher practice is difficult and is only successful with the coordination of a number of factors such as time, the development of a supportive learning community, input from an ‘outside expert’ and involvement of the school’s senior management. The message of this presentation is to set up long-term programmes that work with teachers for at least one year. Even if the numbers of teachers is smaller, the overall effect will be many times greater. Programmes need to value local knowledge and customs, and use these to build a sustainable future.

Teacher education and CCESD

Lorna Down

There are a number of challenges in reorienting teacher education to address CCESD. One is the lack of awareness and knowledge about climate change. CCE is not viewed as priority despite the vulnerability of Caribbean countries. There are also other challenges related to Caribbean culture, teaching and learning, and to the institutions themselves.

A number of strategies that have been tried with some success include having a whole college approach; cross-disciplinary work, a greater connection between the community and the institutions; support for teacher educators (as in a network), and the use of infusion as a methodology.

But most of all what is needed is an education for change and a change in the culture of teacher education institutions. McKeown and Hopkins insist that climate change has two parts: climate and change. The first is about building awareness, knowledge and skills for climate change. The latter is about

educating for change. The focus of this presentation is related to the latter – how do you change the culture of teacher education institutions, so that sustainability issues and, in particular, climate change content and pedagogy become mainstreamed.

Integrating climate change into the formal school curriculum: the Mauritius experience

Chandrashekhar Padaruth

Climate change is undoubtedly an issue of major concern for the whole world. However, SIDS, including Mauritius, are the most vulnerable to its extremes. There are already some visible signs of the negative impact of climate change in Mauritius: long-term decrease in rainfall and the occurrence of flash floods. Other likely adverse impacts include: higher sea level and temperatures, increased intensity of tropical cyclones, higher tides, storm surges and damage to coral reefs, etc. Such impacts will have several social and economic consequences, with vital sectors such as agriculture, transport and tourism bearing the brunt. The Government of Mauritius, aware of the serious situation, has already adopted policies and initiated a series of measures at various levels to minimize the impact of climate change. One such level is the formal education sector, where climate change awareness/ impact/solution has been incorporated in the curriculum at both primary and secondary levels.

This paper focuses on the inputs regarding climate change and related issues, in the context of ESD, which have been incorporated in the geography (and social studies) curriculum at primary and secondary levels. The national primary and secondary curriculum framework and the relevant syllabi are to be thoroughly examined, and the extent to which the curriculum objectives are reflected in textbooks and in classroom practices is to be assessed.

CCE in the context of ESD: a case study

Bholah Ravhee

Climate change is a pressing issue globally, especially in many SIDS. Impacts of climate variability and extreme weather events have been noted in Mauritius, and the latter is likely to experience considerable economic loss, humanitarian stresses and environmental degradation. There are number of initiatives addressing climate change and other related environmental challenges that we face. Both public and private sectors are also making efforts to integrate

climate change in new development strategies. The government recognizes the need for appropriate education that addresses climate change (risks, disasters, risk reduction, adaptation measures, etc.). It also empowers its citizens to make informed decisions and to increase the adaptation capacity of its nations with regard to climate change.

This paper highlights CCE in Mauritius and explores various teaching initiatives addressing/mainstreaming climate change related concepts into formal and non-formal education programmes, at different levels. It emphasizes the role of education in CCA and especially in the context of ESD. The importance of indigenous knowledge and a platform, links between the above institution and schools, and constant dialogue and collaboration with relevant stakeholders (e.g. non-governmental organizations) with regard to climate change are explained in full.

Quality science education: a must for learning about climate change

Emma Näslund-Hadley

In the Caribbean, as in Latin America, the education systems are a largely untapped resource in the fight against climate change. It makes intuitive sense to integrate climate change into curricula and education materials to increase knowledge, and stimulate the identification of coping strategies. However, the problem we face in Latin America and the Caribbean (LAC) is that mathematics and natural science education is of very low quality. The classrooms are characterized by the rote memorization of routine computational operations and the regurgitation of facts, and teachers provide students with little or even erroneous evaluative feedback. Part of the problem is that the content and pedagogical knowledge gaps of LAC teachers are so vast that mathematics and natural science approaches, developed for implementation in industrialized nations, do not produce results in developing countries. As a result, not much learning takes place. National tests show that, on average, students fall short of the goals for mathematics and natural science proficiency set by the educational policies of their countries. If the currently used pedagogical models cannot effectively teach mathematics and natural science, there is no reason to believe that they would serve to produce results in the area of climate change.

Together with several LAC ministries of education, the IDB has been working for the past several years to identify mathematics and natural science education approaches that help children learn in classrooms where teachers have large pedagogical and content gaps. Instead of having students memorize formulae,

the approaches we have tested present students with authentic experiences based on which they can seek relationships, validate theories and communicate findings. Teachers are provided with in-class tutoring to learn how to work with hands-on experiences for students and allow them time to think. Teachers and children learn that there are multiple ways to arrive at the correct answer. They learn to understand concepts and not merely repeat mathematical procedures or memorize the history of science. This year we are initiating work to expand these pedagogical approaches to specifically encompass CCE.

Only by using evidence-based pedagogical approaches that teach students to think for themselves, can we increase awareness and knowledge about climate change. Only when learning takes place can students develop the skills they need to solve real world problems and be mentally fit to take on the challenge of climate change. Quality mathematics and science education is necessarily a cornerstone of CCE.

A systems-based approach to transform climate education in the United States Affiliated Pacific Islands (USAPI)

Art Sussman

The USAPI has a population of about 1,800,000 people spread across 4.9 million square miles of the Pacific Ocean. The Pacific islands are characterized by a multitude of indigenous cultures and languages. English is the common language of instruction in all jurisdictions, but it is not the language spoken at home for most students outside of Hawai'i. Many USAPI students live considerably below the poverty line. The Pacific island region is projected to experience some of the most profound negative climate change impacts much sooner than other regions.

Funded by the National Science Foundation, the Pacific Islands Climate Education Partnership (PCEP) aims to educate the region's students and citizens in ways that exemplify modern science and indigenous environmental knowledge, addressing the urgency of climate change impacts and honouring indigenous cultures. Students and citizens within the region will have the knowledge and skills to advance their and our understanding of climate change, and to adapt to its impacts.

PCEP has developed a regional network, tools and an emerging plan to systemically transform K-14 climate education in the USAPI. More than 50 organizations and networks have joined the partnership. They include all of the region's state departments of education, major universities, community colleges and a wide range of local partners, particularly conservation organizations. PCEP is working with the Micronesia Conservation Trust and The Nature Conservancy to combine the climate education work with local community CCA projects.

When the mangoes have gone

Gail Townsend

In 2009, the Cook Islands presented a paper at the *UNESCO International Seminar on CCE* titled 'Why do I have mangoes in July?' This was in reference to an early mango season and what that represented in terms of climate and environmental change. An early mango season is a sign in the Cook Islands of a bad cyclone season in January–March of the following year. In February the following year, three islands received direct hits from cyclones causing widespread infrastructural damage and leaving many homeless. The title of this presentation refers to the longer term impacts of such adverse events on the wider Cook Islands community, and how the education sector must plan to

mitigate such impacts to ensure the sustainability of an education system that meets the needs of its people and supports the development of the country. It considers the implications with reference to the physical infrastructure, the demography of our islands and schools, workforce forecasts and planning, and the societal implications of longer term adaptation strategies.

Climate 4 classrooms programme

Peter Fell

The British Council, the UK's cultural relations organisation, believes that climate change is one of the greatest challenges of the 21st century. CCE is therefore one of its priorities for work with young people. The presentation briefly introduces Climate 4 classrooms (www.climate4classrooms.org), a website for CCE in schools it is developing in collaboration with the Royal Geographical Society and the Royal Meteorological Society, in close liaison with the Ministries of Education in Mexico, Indonesia, Bangladesh and the National Institute for Education Research in China.

- It demonstrates the multilingual nature of the site.
- It shows how questions such as 'What is climate change?', 'What evidence do we have of climate change?', 'How do we predict the future?' are addressed.
- There are data predicting how the climate will change in many countries around the world. Data from Mexico is shown.
- There are interviews with climate change experts from around the world. An excerpt from an interview with an expert in Mexico may be shown.
- There are currently 12 teaching modules available. The module on 'What causes climate change?' is briefly introduced.

The facility to ask further questions of experts, post information from schools in different countries and form a partnership is demonstrated,

Abbreviations

CANARI	Caribbean Natural Resources Institute
CBD	Convention on Biological Diversity
CCA	Climate change adaptation
CCE	Climate change education
CCESD	Climate change education for sustainable development
CEPA	Communication, Education and Public Awareness
CSDRM	Climate smart disaster risk management
DESD	Decade of Education for Sustainable Development
DRR	Disaster risk reduction
EFA	Education for all
ESD	Education for sustainable development
GDP	Gross domestic product
ICT	Information and communication technology
IPCC	Intergovernmental Panel on Climate Change
LAC	Latin America and the Caribbean
MAST	Monitoring, analyzing, sharing and taking action
MDGs	Millennium Development Goals
NGO	Non-governmental organization
PCEP	Pacific Islands Climate Education Partnership
RAP	Rapid assessment of perceptions
RCE	Regional centres of expertise
SIDS	Small Island Developing States
SIDSnet	Small Island Developing States network
T&T	Trinidad and Tobago

UNCSD	United Nations Conference on Sustainable Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children Fund
UNIDO	United Nations Industrial Development Organization
UNLD	United Nations Literacy Decade
UNU	United Nations University
UWI	University of the West Indies





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