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UNESCO International Seminar on Climate Change Education

27–29 July 2009 at UNESCO, Paris

REPORT

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EXECUTIVE SUMMARY

This report presents a record of the Seminar held from 27 to 29 July 2009 in Paris, focused on the role of education in addressing climate change, linking the local, regional and global contexts with particular emphasis on the challenges faced by Small Island Developing States (SIDS).

This three day international Seminar was organized by UNESCO with financial support from Denmark.

The objectives of the Seminar were to:

- promote the effective integration of climate change education into educational programmes and school curricula;
- mobilize support for teacher training on climate change education;
- enhance the exchange of experiences and good practices on climate change education among ministries, teachers, practitioners and young people;
- identify opportunities for using various networks (such as the UNESCO Associated Schools Network, World Heritage sites, biosphere reserves and the International Hydrological Programme networks) to encourage local field-based education on climate change; and
- identify learning materials and good practices on climate change education and enhance their dissemination via ICT and other means.

There were 54 participants, many from SIDS, representing a multi-disciplinary and diverse group of stakeholders including: teachers and educators, national education representatives/curricula development experts, representatives of school and education networks, scientists and climate change experts, representatives of multilateral agencies, as well as civil society representatives. In addition, a number of individuals from the UNESCO secretariat participated. The seminar included presentations and discussions in plenary and thematic working group sessions.

Fuelled by the rich content of keynote addresses and presentations, participants focused their discussions around three themes: the integration of climate change into educational policies, programmes and curricula; identification of climate change education tools, materials and good practices; and the mobilization and engagement of networks and partnerships in support of climate change education.

There was general consensus that climate change education is an urgent need and should be interdisciplinary and holistic; integrating scientific, social, gender, economic, cultural and ethical dimensions, and incorporating local,

traditional and indigenous knowledge perspectives and practices. Climate change education should be part of an education for sustainable development that helps people to develop the attitudes, skills and knowledge to make informed decisions for the benefit of themselves and others, now and in the future - and to act upon these decisions.

Among a number of challenges, participants emphasised there is a particular need for materials to address the ethics of climate change and the social dimensions of climate change mitigation and adaptation. It was noted that there is a lack of materials other than in English and with little or no framework for establishing quality or appropriateness for a given context.

Another key problem identified relates to the sharing of information coming from different sources and locations between many and diverse networks. Sharing such information is difficult for a number of reasons, among which are: the lack of co-ordination between groups or executive bodies, complexities in working across sectors and agencies, problems in fostering and supporting national and regional networking, and the lack of access to modern communication technologies in developing countries.

Participants made a number of recommendations to UNESCO and its partners, outlining actions to be taken in order to follow-up key issues identified during the seminar.

Priority areas for action included:

1. undertaking a review of existing educational policies and curricula, in order to initiate the development of guidelines to facilitate the inclusion of climate change issues into educational programmes, policies and curricula;
2. undertaking a comprehensive review and inventory of existing tools, materials and practices in teaching and learning climate change;
3. addressing quality assurance and standard setting in climate change education;
4. developing ways for supporting a 'community of practice' around climate change education;
5. enhancing networking and cooperation for action on climate change education among all stakeholders, in particular through actively engaging communities and youth;
6. enhancing action-research in social and human sciences, ethics and adaptable teaching materials to suit specific situations in relation to climate change issues.

As a practical first step to address these immediate concerns, participants recommended the development of a

climate change education knowledge hub to be coordinated by UNESCO in close cooperation with the UNFCCC, engaging international policy actors at strategic levels (Earth Charter, IPCC, UNEP, governments, youth, indigenous and women's groups, as well as community-level initiatives). The primary purpose of this hub would be to serve as a gateway for the exchange of information on climate change education for scientists, educators, planners, youth, funding agencies, media, NGOs, community based organisations and any other interested parties. The hub would also serve as a coordinating mechanism to review existing and prepare new climate change education resources and, promote field activities and networking mechanisms on the ground.

Combining its multidisciplinary nature – bringing together expertise in education, natural and social sciences, culture and communication – with its capacity as the leading UN agency on educational issues, UNESCO is well-placed to address climate change education, which by its very nature necessitates an interdisciplinary approach.

Full presentations and documents presented including the agenda and list of participants are available on the Seminar webpage.



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OPENING

Mr. Koïchiro Matsuura, Director-General of UNESCO and Ambassador Poul Erik Dam Kristensen, Permanent Delegate of Denmark to UNESCO, opened the Seminar.

In his opening remarks, Mr. Koïchiro Matsuura emphasized the role of a stable climate in building a sustainable world. He called for a radical change in the ways we think and act, in particular as regards education and teacher training. He reminded the participants that Climate Change Education (CCE) is an integral part of Education for Sustainable Development (ESD), and encouraged all UNESCO Member States to integrate the values of the Decade of Education for Sustainable Development (DESD) and reorient their education system in this direction. Noting the devastating social, human and environmental consequences of climate change, the Director-General further emphasized the special needs of countries deeply vulnerable to the effects of climate change, in particular SIDS, as well as least developed countries (LDCs), and noted that there is an urgent need to develop appropriate educational materials on climate change for them. In his conclusion, M. Matsuura called for an interdisciplinary approach to climate change education that would also address its social, cultural and ethical implications. As a multidisciplinary Organization providing expertise in education, natural and social sciences, culture and communication UNESCO has a unique opportunity to lead by example, he said, while reiterating the importance of raising the profile of climate change education and ESD on the international agenda.

Ambassador and Permanent Delegate of Denmark to UNESCO Mr. P.E. Dam Kristensen underlined the need to change direction now and transform the current patterns of economic growth into green growth. He noted that Denmark had successfully undertaken such a reorientation, and drew attention to the European Union's engagement to mitigate and support adaptation in the poorest and most vulnerable countries. He stressed the crucial role of education in tackling climate change, and noted that UNESCO has a clear role to play in reforming the education system so that it integrates the values of sustainable development. He

stressed Denmark's commitment to support UNESCO's activities in the field of CCE with extra-budgetary resources, and assured the participants that funding will be put towards ensuring active and appropriate follow-up to the Seminar.

Mr. Mark Richmond, Manager of UNESCO's Intersectoral Platform on ESD and Director of the Division for the Coordination of United Nations Priorities in Education, described UNESCO's long engagement with ESD, which commenced with UNESCO's role as Task Manager of Chapter 36 of Agenda 21 (the Rio 'Earth Summit' Declaration on Environment and Development of 1992). He said that the adoption of Chapter 36, which relates to the promotion of education, public awareness and training, was a key moment in UNESCO's shift towards and embrace of the concept of ESD in preference to 'environmental education'. He underlined that climate change education is one of the key themes of ESD and this was reaffirmed at the World Conference on Education for Sustainable Development (ESD), in Bonn, April 2009. He mentioned that climate change education can be engaged at five levels: its evidence base; its ethics and values; as well as its attitudinal, pedagogical and situational dimensions. However, he also referred to the draft report for the recent mid-Decade review of the DESD, which noted the existence of a number of 'adjectival' education categories that intersect and overlap - such as human rights education, inclusive education, and others. He emphasised the challenges faced by school authorities and teachers to include another 'adjectival' education into already overstretched curricula in a coherent manner.

Mr. Douglas Nakashima, Manager of UNESCO's Intersectoral Platform on SIDS and Chief of the Section for Small Islands and Indigenous Knowledge, emphasized the need to bring together different disciplines, areas and networks of expertise to tackle climate change issues. He gave the example of Sandwatch (<http://www.sandwatch.org>) as a successful intersectoral activity and called for "interplatformality" between UNESCO's related intersectoral

platforms when addressing CCE. Linking the discussions of the Intersectoral Platform on SIDS to the climate change debate, he drew attention to an important shift: as well as debating the threat of climate change, there is a need to mobilize for climate change adaptation. He stressed the risks for rural and indigenous communities, while also highlighting the knowledge and traditions that may help them adapt to a changing climate. Finally, he discussed the initiative "On the Frontlines of Climate Change" (<http://www.climatefrontlines.org/en-GB>) as a key resource for climate change awareness and education.

Dr. Patricio Bernal, Assistant Director General of UNESCO's Intergovernmental Oceanographic Commission and Manager of the Intersectoral Platform on Climate Change explained that the Platform was established partly as a direct response to the UN Secretary General Ban Ki Moon's call for action on climate change in preparation for a new global agreement on climate change. He noted that UNESCO has been working on various aspects of climate change for the last 4 decades or so, in particular on science-related issues through the World Climate Research programme. More recently, the World Commission on Ethics of Scientific Knowledge and Technology (COMEST), initiated by UNESCO, launched its report on the ethics of climate change. Seeing the Seminar as the starting point for more joint activities between different sectors and between UNESCO and its partners, he underlined the importance of working together on improving the understanding of climate change and its complex mechanisms and interactions – as well as of the global educational system – in order to lay the foundations of a more sustainable world.

PLENARY I

CLIMATE CHANGE – SCIENTIFIC, SOCIO-ECONOMIC, CULTURAL, GENDER AND ETHICAL PERSPECTIVES

Moderated by Mr. Eduard Muller, the session aimed at exploring climate change from different perspectives. The presentations and discussions demonstrated that climate change is indeed a complex issue and requires understanding and tackling from multiple perspectives.

KEYNOTE ADDRESSES

Climate Change and its complexities

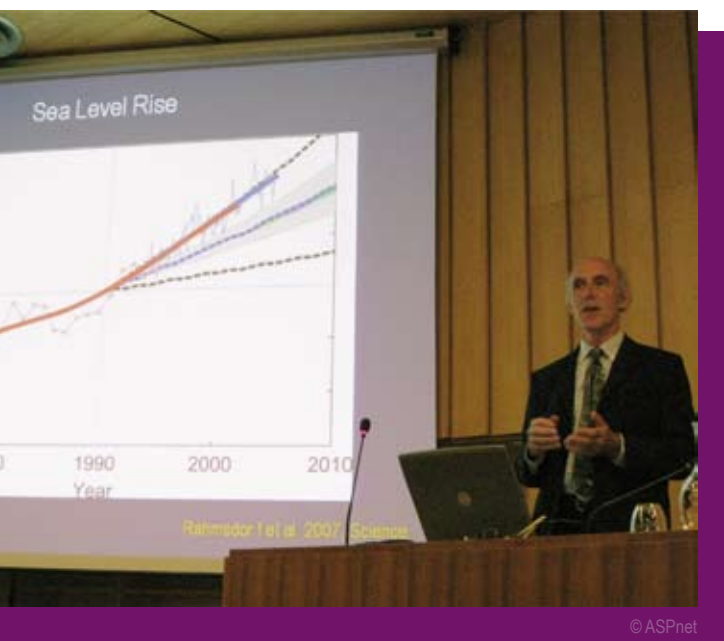
Ms. H. Rasmussen, former Greenland minister of culture and education, discussed the role of local communities in building a more sustainable world. Drawing on her experience of the Inuit in Greenland, she highlighted the fact that local communities will unfortunately have to pay the highest price as a result of the impacts of climate change. She stated that the indigenous people's cultures, traditional knowledge and spiritual wisdom can contribute to the protection of the environment and welfare of mankind, and therefore must be protected and recognized. She expressed her concern about the lack of global awareness in this regard, and called specifically for supporting the voice of youth and engaging them in action on climate change. She also noted that the Earth Charter, with which she works actively, as a valuable tool for promoting education and learning on climate change.

Climate Change, facts, impacts and global security

Prof. C. Reid gave an overview of the latest climate change projections, making specific reference to rising land and ocean temperatures, the hydrological cycle and CO₂ content, among other issues. He spoke about impacts on biodiversity, sea level, ice and glaciers and global security. He made particular reference to the Stern Review Report (2006) on the economics of climate change, emphasising that it will be cheaper to act now, rather than to wait and bear the costs of continued climate change. He emphasised the importance of passing on the right messages regarding climate change to children - the next generation - and lamented the fact that we are not tackling issues with the urgency and the resources required.

DISCUSSION

In the ensuing discussion, participants acknowledged that many people are still not taking the dire predictions of climate change impacts seriously. Unlike people in big cities, local and rural communities suffer the direct consequences. Concern was expressed about the disillusionment of youth and their feeling of fatalism in relation to climate change, its impacts and their own role. In many countries, a number of youth related initiatives take place, but are unfortunately not politically or formally endorsed. One way of empowering youth is by involving them in taking action. Climate change is a huge and complex issue – therefore, the essential thing is to break it down and work step by step. One could start



by identifying each particular issue and thinking about what could be done in terms of policy and practice. Demonstrating what young people elsewhere are doing, connecting and networking helps maintain positivity and motivation. Youth also need to be encouraged to take up science, maths and engineering which will be required for their subsequent careers technology and biotechnology – areas of scientific research that may help find solutions to climate change.

There was general agreement that the world has all the means for creating a sustainable economy in terms of economic mechanisms and technologies. But the question remains of how to push political players to join the global action to limit future emissions and build a sustainable world. For instance, through financially-based incentives such as energy and carbon taxes, by influencing political players, by improving sustainability practices, and by improving the communication across continents and countries.

Participants also highlighted the need to develop a culturally relevant and high-quality education, backed by a sound framework and an agency-centered approach. Education should be democratic, inclusive, empowering, protective and child-centered. The Earth Charter initiative was illustrated as a possible framework to address some of these concerns. It was initiated by a group of people from many countries and cultures with a common vision to protect the rights of the earth and our environment – equivalent to the Human Rights Charter. It includes tools and programmes for teachers and students. It is also endorsed by UNESCO as a tool in DESD. For more information on Earth Charter, please see <http://www.earthcharterinaction.org>.

THEMATIC PRESENTATIONS

Climate ethics and justice

Mr. J. Hattingh introduced the recent COMEST report, which aims to help governments develop institutional and normative instruments in order to respond to climate change in an ethical manner. He explained that the ethical and justice implications of climate change are many and relate to a number of factors. Among these are: unfair distribution of burdens and benefits; the inability of the most vulnerable and affected to participate in the decision making; lack of compensation; lack of recognition of suffering and needs; uncertainty and unpredictability of changes; and impacts and intergenerational issues. There is a need to improve our understanding in all the above areas. A start could be made by educating decision-makers and scientists. Mr Hattingh concluded that the identification of the ethics of climate change would require active, system wide collective action to build robust and resilient individuals, households, communities, societies, and governments. It would require the world to live with uncertainty, and start reducing the effects of a high-risk mode of living and actively address

the mechanism through which injustices in the world are created, justified, strengthened and perpetuated.

Understanding climate change from a gender perspective: educational challenges

Ms. Irene Dankelman highlighted that there is a gender implication of climate change along with the ethical dimension. According to her, climate change relates not solely to the science domain but deals with all aspects of society. Judging from the impacts of climate change on women and community life in Ghana and Bangladesh, she highlighted that climate change is not gender neutral – that in fact, gender inequality is the most pervasive of all inequalities. She also noted that gender equality itself is shaped by other social differentiators such as race, ethnicity, class and age. Acknowledging the risks faced by women because of climate change, and noting that women and children are the most affected when any natural disaster strikes, she reminded the Seminar that it is crucial to empower women so that they can keep on playing their role in adapting, mitigating and raising awareness, despite their vulnerability. In ending her presentation, she proposed a framework for gender specific climate education that should incorporate, inter alia, an understanding of the socio/ecosphere interface; realities of diverse lives; gender-awareness training in science and policy, including methodologies and networking with expert groups such as the Women's Environment and Development Organization (WEDO), gender-cc networks, gender-disaster networks, and the Global Gender Climate Alliance (GGCA).

Why do I have mangoes in July?

Ms. Gail Townsend and Ms. Jane Taurarii discussed the implications of climate change on culture and livelihoods in the Cook Islands. They explained how seasons are changing – there are mangoes in July already, while the mango season in the Cook Islands normally runs from November to February. Arapo – the traditional Cook Island calendar for fishing and planting - has been desynchronised. Adverse weather events have forced families to emigrate from certain areas, and this has implications on identity, culture and language and productivity. Similarly, climate change is impacting health, fresh water, fishing, land use and other traditional practices. They concurred with previous speakers that focus needs to be on learning rather than teaching climate change in general, and on the need to integrate youth in solutions and ensure that their voices are heard.



PLENARY II CLIMATE CHANGE EDUCATION – A MULTI- FACETED CHALLENGE

DISCUSSION

Participants noted that there is a need to educate parents in order to fight the disillusionment of their children. Too many parents do the opposite of what is taught at school, and thereby put contradiction in children's minds. It was also felt that parents are often overprotective and do not let children express themselves. However, children are resilient – perhaps more than adults. It is important to let them face the facts, sooner rather than later.

Referring specifically to CCE in developing countries, some participants expressed their concern of the very low level of awareness of what climate change means, its causes and consequences, and how to address them - even though developing countries stand to be the most impacted. As developing countries contribute very little to climate change in terms of green house gas emissions, the focus should be on vulnerability and adaptation. It was emphasised that CCE and ESD should be oriented according to the context, taking into consideration local traditional knowledge and practices. Passing traditional knowledge and practices to children and young people forms the core of World Heritage education, for example. Starting at a very young age, children are encouraged to have a sense of their identity, traditional values and knowledge - and understand that their actions have an impact, positive or negative.

Global networking between those countries who contribute less and those who contribute more was proposed as a way to empower people from the former, and bring their voice to the international arena. Given the many differences between countries regarding their responsibility for climate change as well as their political and economic organization, climate change provides an opportunity for countries that are historical contributors and those impacted by climate change to work together to understand what it means to be responsible and to redefine humanity. It was also noted that often we think that problems such as climate change are to be solved by the government or scientists. However, we all need to be aware that we are involved - and recognize the need to educate the "person on the street".

Participants felt that climate change is still not getting the visibility it deserves. Governments should be convinced to bring climate change in the same arena of attention as influenza A, the financial crisis, and other news getting big media coverage.

As moderator, Ms. Heila Lotz introduced the session by stating that climate change is a challenge for the society as a whole. Redefining education – in terms of its purpose, content, approach and pedagogy, is part of redefining society to address climate change. This should lead to a future-orientated education that would enable and empower learners in the education system to develop the competency, knowledge and skills that will enable them to live a sustainable future.

KEYNOTE ADDRESSES

Climate Change implications for SIDS

Dr. Leonard Nurse began by reiterating that there is no longer any argument as to whether the climate has become warmer - nor as to the cause of this warming - over the last 150 years. He outlined the main drivers and trends over the course of this warming trend, starting at the time of the industrial revolution. He then went onto model climate change projections for the 3 main SIDS regions – the Caribbean Sea, the Indian Ocean and the Pacific Ocean: rising sea levels, increasing draught, increase in frequency and intensity of tropical cyclones/hurricanes, etc. He expressed concern regarding the major risks and impacts SIDS will have to face in the future due to climate change, which will have many negative effects on natural ecosystems and on socio-economical conditions. The forthcoming impacts of climate change on agriculture, fisheries, forestry, tourism and trade will put SIDS populations in danger. SIDS also have low adaptive capacity and the cost of adaptation is high relative to the GDP. According to Dr. Nurse, it is time to drastically reduce global greenhouse gas emissions to a level that minimizes economic, social and environmental dislocation, and to build the necessary capacity to enable SIDS to access maximum benefits from facilities such as the Clean Development Mechanism (CDM) and the Adaptation Fund under the UNFCCC.

Climate literacy and climate change education

Ms. Carole Young defined climate literacy as the ability to participate in a discourse about climate change with a full understanding of the terminology. To be climate literate, teachers and students need to have: a basic understanding of scientific concepts – with a deeper level of ‘systems thinking’; develop attitudes and values that reflect respect for the environment and all its components; and sense of personal and social responsibility. In her view ‘sustainability’ literacy and climate literacy go hand in hand. She highlighted her experiences of cross-curricular and collaborative work with teachers from various disciplines, scientists and students on developing and implementing sustainability learning programmes. She provided the example of SEREAD – the Scientific Educational Resources And Experience Associated with the Deployment of Argo Drifting Floats programme - a tool for teachers which aims to support them towards making their students literate about weather patterns, role of oceans and climate change. SEREAD is an interagency initiative with multiple donors, implemented in several Pacific Island countries including Samoa, the Cook Islands and Fiji. Elaborating on her experience with SEREAD, she emphasised the need to be flexible and innovative, and able to adapt to country-specific contexts in the development of tools and materials for teaching and learning about climate change

DISCUSSION

Participants emphasized the need for demystifying scientific language – especially in SIDS. An example of the challenges this entails is the Pacific, where science is not taught in local/indigenous languages. It was felt that teaching and learning climate change in a foreign language, in this case English, prevents students from really comprehending that it is also a local issue - and not just something that belongs in text books or is only happening elsewhere in the world.

Thus, pedagogy on climate change in a foreign language is seen as a very serious issue. One way to address this is through developing literacy strategies around climate change. Another alternative is to translate material into local/indigenous languages, even though the difficulty of choosing the correct translation of technical terms in these languages remains. In addition, it was felt that understanding climate change requires other basic transferable skills such as interpretation and comprehension, not just basic science. Interpreting a graph, for example, should not be addressed only in climate change education, but should be taught to children in biology, chemistry, geography, etc.



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THEMATIC PRESENTATIONS

Climate change education for and in SIDS

Ms. Jeanette Larue reiterated that given the huge implications of climate change to SIDS, promoting education around the subject is crucial. Education can change the way in which things are done through behaviour modification, and can offer both medium and long term solutions to climate change challenges, including building a more resilient population. Using her experience in the Seychelles, she explained that climate change education must be child-centred and participative – otherwise students tend to get bored easily. Providing critical knowledge, skills and values; creative problem solving; and social transformation are some other criteria. She went on to list a number of initiatives that are underway: mangrove rehabilitation, Sandwatch, coping with food shortages through promoting local and traditional crops, and rainwater harvesting to address drought. To address some of the challenges, she proposed more networking for CC educators (local, regional & international), in order to stimulate the sharing of experiences, best practices and resources – and to ensure consistency between sustainable development strategies.

The United Nations Framework Convention on Climate Change and Education (UNFCCC)

Ms. Laurence Pollier introduced Article 6 of the UNFCCC on Education, Training and Public Awareness, which calls on governments to promote the development and implementation of educational and public awareness programmes, promote public access to information and public participation, and promote training of scientific, technical and managerial personnel. The New Delhi work programme is a flexible programme of action engaging all stakeholders, and recommending a list of activities that could be undertaken at the national level to facilitate the implementation of Article 6 activities. The educational scope of Article 6 relates to development/implementation of education and training programmes focused on climate change targeting young people and secondment of personnel to train experts. In formal education, action translates into further integrating climate change issues into curricula and identifying needs and tools for facilitating the implementation of the framework. In terms of implementation, developed countries are far ahead of developing countries. To address this gap, she mentioned a host of activities including: development and integration of the subject of climate change into curricula; development of educational materials; training of teachers; and strengthening academic and research institutions. She



highlighted the Climate Change Information Network (CC:iNet) – a web portal which serves as a clearinghouse for information sources on public information, education and training in the field of climate change. In ending her presentation, she reminded the participants that education will not be on the agenda of COP 15 even though it is a high priority in UNFCCC.

ESD and Climate Change Education

Mr. Philippe Saugier outlined the Carboschools initiative as a tool where scientists and teachers work together towards understanding and tackling climate change issues. He emphasised that the educational response to climate change worldwide has to be elevated to the same scale as the challenge it represents. He highlighted the immediate priority of including education in climate negotiations at the same level as mitigation and adaptation. To achieve this, he called for more investment and reforms of the educational system. He proposed a carbon tax where part of the income benefits education through direct CO₂ offsetting in school communities, and for long-term societal change by mainstreaming ESD. In addition, he summarized the key messages that emanated from the Climate Change workshop at the 2009 World Conference on ESD in Bonn.

Climate Change Education Campaign by the Ministry of Education in Denmark

Mr. J. Dalsgaard defined the challenge of climate change education as he sees it: How to mobilize the necessary time, resources and teachers' commitment to interdisciplinary, problem solving and action-oriented climate change education. He then gave an overview of the campaign initiated by the Ministry of Education in Denmark in order to put CCE issues on the negotiating table at COP 15. He highlighted climate education initiatives such as the "Bliv klimalærer" programme aiming to build up a Danish climate teachers network, which has already 2000 + teachers involved from all over the country. They act as resource persons on climate change education and share experiences among them. A number of resource materials have been developed with the help of the Danish government, including "Tikopia – Living with tropical cyclones". In order to expand these efforts globally, an international teacher's website, www.teacherscop15.dk has been launched by the Danish Ministry of Education as a sub-site of the COP 15 official website. J. Dalsgaard also announced the upcoming international teachers' conference "Inspiring Climate in Education" (ICE 09) which will be held in Denmark in October (<http://www.ice2009.org/>). He ended by highlighting Denmark's close cooperation with UNESCO on various climate change and education initiatives.

PLENARY III

SELECTED CLIMATE CHANGE EDUCATION PRACTICES AND TOOLS

This session aimed at demonstrating and sharing a number of tools and good practices related to climate change education. Some of these initiatives have been around for a while, while others are recent or new.

'CLIMATE CHANGE' IN TEACHING AND LEARNING FOR A SUSTAINABLE FUTURE

Dr. Clayton White began by posing the question: what is education for? In the words of David Orr, all education is environmental education - and as heard during the previous sessions, there is a need to move away from 'adjectival' educations. He presented a multimedia teacher education programme produced by UNESCO and called "Teaching and Learning for a Sustainable Future" (TLSF) (<http://www.unesco.org/education/tlsf/>). TLSF contains over a 100 hours of pre-service and in-service training material for teachers, curriculum developers and policy makers. Acknowledging Ms. Young's remark that only 2% of all teaching materials produced actually get used in classrooms, he emphasised that the crucial part is in follow-up support, to disseminate the tool, to provide appropriate training, to back-up, and to create a community around the resources. The forthcoming TLSF Version 6 has been significantly updated and redesigned, and will include two new modules, one of which focuses specifically at climate change. The Climate Change module provides resources for teachers so that they can feel confident in their knowledge of climate change science and the impacts of the climate crisis, and plan interesting and relevant lessons for their students. The tool is flexible and adaptable to national and local contexts.

SANDWATCH

Dr. Gillian Cambers and Mr. Paul Diamond presented the Sandwatch programme. Dr. Cambers outlined the vision of the programme: to change habits on a community basis by building ecosystem resilience, and to develop awareness of the fragile nature of the marine and coastal environment and the need to use it wisely. She also explained the methodology "MAST": monitoring the environment; analysing the results; sharing the findings with everyone (children parents, teachers, decision-makers, civil society, etc.); and taking action. She discussed the example of Sandwatch activities in Dominican Republic, where Sandwatch groups managed to catalyse an injunction against a hotel which built a jetty without permission or proper scientific assessment. Lessons learnt so far from the programme include: always employ accurate scientific and relevant information; target changes likely to take place in the next ten years, while keeping the longer term picture always in mind; focus on those particular changes relevant to a particular group's interests; and provide examples of positive action that groups and individuals can undertake. In addition, she presented the new Sandwatch Manual (which

will be available on the Sandwatch website at the end of August 2009). Mr. Diamond talked about the networking aspects of Sandwatch through the establishment of local networks; displays; power point presentations; establishing

a website; using the media; making a newsletter; social networking; and making a video.



VISUALISATION OF CLIMATE CHANGE

Ms. Julia Hasler introduced the project "Visualizing and understanding the science of climate change". The chemistry profession and chemistry educators play a crucial role in creating understanding about global climate change and working toward solutions. The objective of this project is to develop a set of interactive, web-based materials for global dissemination to help students visualize and understand the underlying science of climate change. Target audiences are (a) teachers at the secondary and first year tertiary levels, (b) students at those same levels, and (c) chemistry professionals. Visualizations will emphasize the fundamental chemistry of climate processes, but will also present research climate models, and place anthropogenic inputs to our atmosphere in a geo-political context. The project is a collaborative effort among a number of organisations led by the International Union of Pure and Applied Chemistry, and will contribute to the International Year of Chemistry in 2011.

CLIMATE CHANGE EDUCATION ACTIVITIES AND THE DANISH ASSOCIATED SCHOOLS PROJECT NETWORK

Mr. Carsten Skjoldborg highlighted activities undertaken by the Danish ASPnet (Associated Schools Project network) in collaboration with the Ministry of Education to raise students' awareness about climate change and education for sustainable development in general in the context of UNDES. A booklet explaining ESD and the Decade has been produced and is available online at http://www.ubuportalen.dk/images/stories/dokumenter/unu_web.pdf. Thirty-five primary and secondary schools participated in the "relay race for sustainable development", where each participating school had to undertake a small project relating to sustainable development and pass on a 'sustainable baton' which ended with them handing it over to the Minister of Education. This event marked the launch of DESD in Denmark. Other projects include, "Images from the Future" where students were asked to visualise how the world would look in 30 years, and to present their vision in the form of drama, news articles, presentations, etc. These were displayed in the Danish National Museum. Finally, Mr. Skjoldborg presented a project through which students generated electricity for their school by using an exercise bike connected to a generator and battery.

DISCUSSION

Questions were raised on the lack of reference to adaptation and disaster risk reduction in climate change education materials and tools. Another issue raised concerned the scale of activities – given that most of the examples discussed were of small scale. A key issue is therefore how to up-scale initiatives to influence teachers and students to change their behavior. One participant noted that there are 56,000 teachers in Costa Rica alone, and about 60 million across the globe.

A number of participants noted that national science policies were not well developed and have little impact in rural areas, such as in the small island countries of the Pacific. Decision making at the local level is centered on the traditional and customary roles of leaders in the rural communities rather than on science. It is a huge challenge to change behaviors within this context.

In summing up, Mr. Hopkins as moderator, noted that much was said about formal education, and therefore that the Seminar up to now had focused on the “supply” side of education, without considering the “demand side”. However, it is crucial to take into account this “demand” side, which gathers all the people who need to be convinced that there is a changing climate and that there is a need to educate about climate change all over the world. To move CCE forward, it is wrong to only think in education terms, i.e. on how to reach teachers and students. It is important to work

on how to reach each citizen of the world and make him/her understand sustainable development and climate change issues. Of course one needs to engage the world system not only through education but also through training and public awareness. In doing so we could hope to let people – not only in Western countries but also in developing ones – see climate change as a number one issue to tackle.

He echoed Carole Young’s remark, and said that it is important to change curricula. It is important to prepare new materials and make them available to teachers and students. However such efforts are not worthwhile if they stop there. Rather than just providing financing, we need to think further, and ask how to use such materials; how to take charge of them and how to assess them. Therefore, we need to look into reorienting the whole education system.

To build a sustainable world, Western countries – whose inhabitants have a heavy ecological footprint – must work on greening their society. Their current development pattern must not be exported towards developing countries, as this would risk building a very unsustainable world where everyone will consume more and more until all the resources will be depleted. Hence, he called for North-South collaboration towards developing a vision of what is good education, towards what purpose, and how to go about it.

THEMATIC WORKING GROUPS

Following the plenary sessions of Day 1, participants were divided into three groups, for more detailed discussion on the following themes:

Working Group 1: Integrating climate change education into educational policies, programmes and curricula

Working Group 2: Climate Change education tools, materials and good practices

Working Group 3: Mobilizing / engaging networks and partnerships for climate change education

The groups were given specific terms of references to guide them in their discussions and the outputs expected of them.



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REPORTS FROM THEMATIC WORKING GROUPS

Working Group 1: Integrating climate change education into educational programmes and school curricula

Working Group 1 began its work on the premise that past and current approaches to education have undoubtedly led to the current environmental situation and thus solutions can only be found in a repositioning of education and learning in all aspects of how we live. The current crisis therefore, presents a unique opportunity to utilize the principle of ESD to drive humanity's response to climate change.

The group identified a number of challenges: educational reform - towards a more student centred and participative education; institutional limitations – in terms of lack of capacity; stakeholder engagement – not just of ministries of education, but of students, educators parents and communities as a whole; localization – meeting local needs; funding – not only looking for additional sources but to for efficiency in its utilization and evaluation of change.

In terms of taking action, the group called on UNESCO to be driving force to support countries to review and reorient their education systems to provide quality education that focuses on developing competencies of students to respond to change and contribute to a sustainable future. These could be in the area of curriculum development, eco-friendly procurement and infrastructure, professional development, and pre- and in- service education.

Working Group 1 reminded participants that CCE should not become a new “adjectival” education. It expressly demanded to drastically accelerate the mainstreaming of ESD and with it CCE in all its components, in all sectors and levels of education, public awareness and training worldwide.

It was suggested that such mainstreaming should involve:

- changing learning environments to become carbon neutral;
- reforming educational systems towards sustainability: curriculum change, structural change and reorienting teacher education;
- improving preparedness for and adaptation to climate change impacts in SIDS and all other vulnerable places;
- In conclusion, the group requested UNESCO and Denmark to lead a concerted action to address the above mentioned challenges and recommendations.

Working Group 2: climate change education tools, materials and good practices

Working group 2's problem statement noted that there is an abundance of materials useful for and used in climate change education. However, there are also many issues such as: a lack of concern for pedagogy in many materials, adopting passive and transmissive - rather than participatory - approaches; the variability of quality of resources; the difficulty to access materials in local languages; the difficulty in identifying appropriate materials according to the context and location; and the lack of interaction and cooperation between materials developers and users. Clearing houses, where they exist, are not quality controlled for content, nor are they user-friendly. The group also noted that while the internet is a useful tool, we need to be aware that there are many places in the world with little internet penetration and access.

In terms of gaps, they identified a particular need for materials to address the ethics of climate change and the social dimensions of climate change mitigation and adaptation

Bearing in mind the premise – “to manage the unavoidable and avoid the unmanageable”, they envisioned climate change education to be: supported by information, materials and methodologies that are easily accessible; sensitive to the needs of specific forms of education and of various stakeholders; oriented towards solutions and positive action; adaptable to regional and national priorities; appropriate and responsive to local circumstances and concerns; and holistic, by considering scientific, ethical, economic and social dimensions.

Key approaches to climate change education should include: local, traditional and indigenous knowledge, perspectives and practice; participatory approaches; and learning through action and in the field.

A number of action points were proposed. Among these are: the need to develop a model to provide methodological guidance and background information for educators that will also provide tools for use in the classroom and is easily adaptable to the needs of different countries, different forms of education and different disciplines; a “community of practice” of teacher support networks; addressing specific gaps – particularly ethics of CC mitigation and adaptation; putting education on the agenda of COP15, and proposing that one of UN agencies takes the issue forward; and finally, an international inventory of resources.

Working Group 3: Mobilizing/engaging networks and partnerships for climate change education

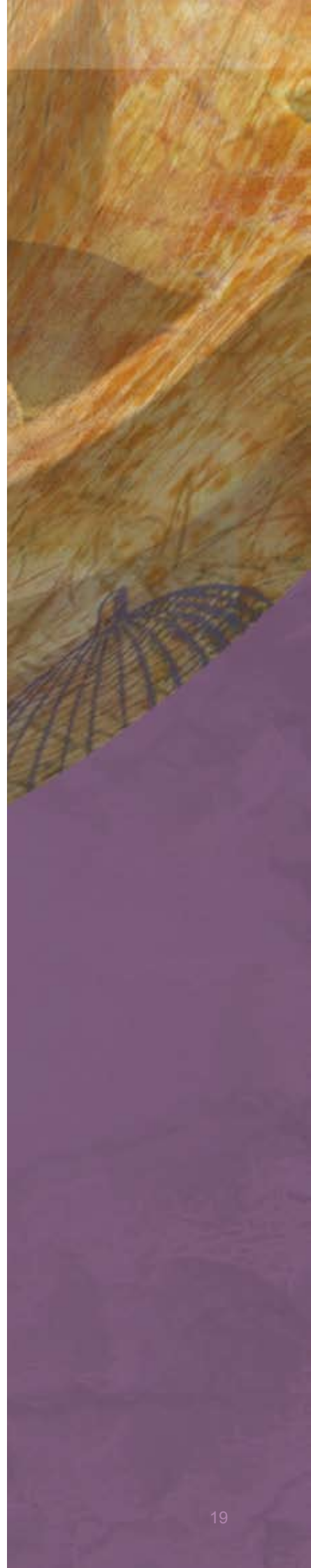
The group started by elaborating the desired and necessary characteristics or principles of climate change education. Among these, the group underlined the importance of giving students access to training and to the latest insights in climate science; enabling communities to integrate scientific material into their local and traditional knowledge systems, and conversely to enrich scientific knowledge with their wisdom. Particular emphasis was placed on empowerment of – and engagement in – creative and innovative contributions to climate change education methods.

In addition, Working Group 3 called for:

- better understanding of ecological, social as well as economic aspects and implications of climate change, and development of appropriate responses, paying specific attention to the needs of those living in poverty, children, elderly people, other vulnerable groups, and countries such as SIDS;
- research on vulnerabilities caused by climate change, paying specific attention to the manner in which these vulnerabilities amplify and increase other vulnerabilities caused by other factors;
- strengthening the understanding of societal mechanisms through which these vulnerabilities are caused, justified, hidden, strengthened and perpetuated – and can be challenged.

According to the group, the main problem is how to share information coming from different sources and locations between many and diverse networks. This is due to a number of reasons, among which are: the lack of co-ordination between groups or executive bodies, complexities in working across sectors and agencies, problems in fostering and supporting national and regional networking and the lack of access to modern communication technologies in developing countries.

The group proposed the development of a climate change education knowledge hub coordinated by UNESCO, engaging international policy actors at strategic levels (Earth Charter, UNESCO, UNFCCC, IPCC, CBD, governments, youth, indigenous and women groups, etc.) as well as community-level initiatives. The primary purpose of the hub would be a doorway for the exchange of information on climate change education for scientists, educators, youth, funding agencies, media, NGOs, CBOs and any other interested parties.



FINAL DISCUSSION

The last plenary session gathered all the participants following the end of the working group sessions. The session was co-chaired by Dr. Patricio Bernal, Mr. Mark Richmond and Ambassador Poul Erik Dam Kristensen.

Dr. Bernal launched the debate by asking the following question: “how to ensure that what has been produced during the seminar can be moved forward in an effective way?”

Participants commented on the need to clarify where the specific gaps are in addressing the ethical dimension of climate change. Similarly, the lack of materials, projects and activities on climate change adaptation as well as the social justice dimension was highlighted. A general consensus was that now, when the problem of climate change has been more or less universally accepted, the international community has to think carefully about how to face it and how to deal with its negative impacts. Adaptation must occupy a central place in this, as must mitigation. It is time to demonstrate climate change in a different way: not only from a physical and natural sciences point of view, but also referring to the social and human sciences.

A lack of standards or standard setting in climate change education was another major issue highlighted. There is a need to develop guidance and leadership in this new discipline and reach an agreement on minimum standards for climate change education. However, it was acknowledged that we need to put things in perspective – to understand that it will take time and action from everyone. In some respects, seminar participants have called for an “education revolution” rather than a reform. This will require development of new tools, standard setting, organisation and involvement of the whole global community.

A question referring to the interdisciplinary nature of climate change education was raised, asking how climate change could be integrated into curricula so that it feeds horizontally into all areas. Climate change calls for an interdisciplinary curriculum framework that not only is inclusive but also reinforces the links between science, the environment, and other important areas such as economy, culture, ethics and justice, gender equity, and peace. Further, the question of how to address uncertainty was raised. As there is a real lack of pedagogical materials and information on this subject, there is a need for building a strategy on how to deal with this issue from an educational and pedagogical perspective.

Participants felt that precisely because of the uncertainty that exists in climate change – we don’t actually know what we are preparing the children in the class now in the future for - integration of climate change education across the curricula is not enough and is not the best way to go. Rather, there is a need to prepare students for the future,

not only teach them about climate change. Therefore, it is crucial to review the whole education system, to teach young people how to be critical thinkers, how to be lifelong learners, how to manage uncertainties and change, and how to be adaptable. Briefly put, we need to reform education systems to produce citizens for the future rather than simply individuals who know 'about' climate change.

It was also proposed that risk management is one way of dealing with uncertainties, as practiced by forecasters and insurance companies. Good risk management strategies in adaptation – such as promoted by the IPCC as “win-win” or “no-regrets” strategies - are appropriate in dealing with uncertainties.

Many participants felt that there is no lack of information at all – in fact we are drowning in information - but we still see little change. Therefore, as a next step, we need to ensure that we engage with experts knowledgeable behaviour modification and sociology. There is a gap between what students learn in school and actual societal behaviour. Education needs to be transformative. Necessary skills and concepts that would facilitate transformation (e.g. open-mindedness, reflective and critical thinking, problem solving, etc) need to be included in all subject curricula.

The recommendations of the Seminar need to be translated into concrete steps and from the side of UNESCO, the Intersectoral Platforms on Climate Change, on SIDS and on ESD will play their roles towards making this happen. UNESCO will provide its support to a 'community of practice' (i.e. people who are interested and actively engaged in climate change and climate change education). The Seminar has also called for the development of a realistic and effective action plan. To pursue this, there are efforts to be made, more research in social and human sciences, ethical principles, and teaching materials which could be adapted to each particular situation. Finally, community empowerment is crucial to move such recommendations forward.

Concerning COP 15, it was recognised that governments play the lead as negotiators, and as the ones to decide what goes in and what goes out, and who will - in the end - be the ones to come to an agreement on climate change. UNESCO will support member states in putting forward climate change education, through UNFCCC Article 6, as a legitimate issue at COP 15.

A proposal was put forward to provide training for the high-level people who will participate in the international negotiations on climate change, for instance by organizing a Ministers of Education round table at UNESCO.

Participants requested UNESCO to facilitate the setting up of an 'advisory group' on quality assurance on climate change education materials and practices.

The interlinkages between DESD and climate change education calls for a joint agenda for addressing these two issues. The proposed 'hub' could provide the knowledge management base and would be an important support mechanism for countries. It was noted that this fits well with UNESCO's mandate to promote the 'climate change knowledge base' together with WMO within the UN system. To ensure action on the recommendations, the most straightforward approach is to integrate them into UNESCO's formal workplans, backed by adequate resources. However, communities, autonomous organisations and the United Nations agencies must also work together in a wider framework of cooperation.

The question of validating or assessing the quality of climate change education was addressed by Mr. Mark Richmond. It was proposed that a starting point could be a filtering of information to identify facts and expertise, through peer reviews of science, review of good practices and through expertise. The notions of professionalism and 'communities of practice' are important in this regard.

However, participants noted that there is an enormous gap between knowing and having access to information and changing behaviour. There is a need to investigate and understand why this is the case. We need more than just education. Mr. Mark Richmond said that UNESCO will do its best to put the recommendations into practice, and the report from this climate change education seminar will be tabled during the next meeting of the Inter-Agency committee on ESD.

In his closing remarks, Ambassador Dam Kristensen thanked all the participants, rapporteurs and the secretariat for their contributions and enthusiastic involvement. Implementing the recommendations of the seminar in our countries, workplaces, the General Conference here in UNESCO as well as at COP15 will be a huge task. Education and climate change is a long term area of work, but in the short term we can try to lobby our governments to take action at COP 15.

However, COP 15 is a largely political process focused on negotiations for post-Kyoto, and there is the danger that climate change education may fall on the wayside. Hence the necessity to impress on our governments that the political cost of leaving COP 15 without an ambitious agreement would be great.

WAY FORWARD

The Seminar provided a unique opportunity to gather a number of key stakeholders from across the globe, in particular for SIDS to address the complex and urgent issue of climate change education. Through the plenary presentations on diverse topics related to climate change education and the ensuing discussions, participants explored the challenges encountered and possible solutions. Working in Thematic Groups allowed participants to delve deeper into these issues and provide a more refined vision for climate change education, the problems involved and propose a set of recommendations and coherent actions to move forward. Some of these are to be addressed by UNESCO and its partners for implementing relevant joint activities in climate change education, while others are of a more general nature.

Some of the key recommendations and actions proposed include:

- accelerate the mainstreaming of ESD and with it CCE in all its components, in all sectors and levels of education, public awareness and training worldwide.
- set up an advisory group and organise a technical meeting as soon as possible to define key steps leading to and continuing from COP 15, and to infuse the Bonn Declaration and other climate change and ESD related international commitments into COP 15; organise in that perspective a high-level education core event at COP15 and publicly release its outputs.
- identify and design, by 2010, as part of the New Delhi work programme review, the necessary support infrastructures and the long-term financial instruments for scaling up climate change education. In particular, involve UN agencies in (i) designing an “IPESD” devoted to advancing globally the educational response to climate change, as inspired from the great role played by IPCC to progress our scientific understanding; and (ii) investigating the possibility to channel part of the funds from Carbon Taxation and Carbon Trading to support ESD.
- undertake a full and relevant inventory of CCE related resources;
- Enhance the education component of UNFCCC’s CC:iNet through close cooperation with UNESCO or alternatively establish a pilot clearing house dedicated to climate change education and identify a moderator to take it forward who will be supported by the teachers, policy makers, NGOs and other relevant partners;
- create better teacher awareness of climate change issues and engage them through Ministries and via curriculum;
- Enhance cooperation between Ministries of Education and Environment by disseminating information and discussing with them how to reform and/or improve the educational system.
- UNESCO be a driving force to support countries to review and reorient their education systems to provide quality education that focuses on developing competencies of students to respond to change and contribute to a sustainable future;
- National governments, in collaboration with UNESCO and other partners, review existing education policies, curricula and practices to clarify whether they promote or hinder the pursuit of a sustainable future and to encourage the reorientation of unsustainable policies;
- UNESCO, in the framework of the DESD, take a proactive role in assisting SIDS with the implementation of successful CCE initiatives incorporating ESD, taking into consideration the value of traditional, local and indigenous knowledge;
- UNESCO take the lead to create a “community of practice” for teachers’ support networks;
- UNESCO take the lead to address specific gaps, particularly in terms of climate change ethics, justice and uncertainty, and adaptation;
- UNESCO to facilitate the setting up of an ‘advisory group’ on quality assurance on climate change education materials and practices;
- a CCE knowledge hub be established, as a doorway for exchanges of good practices, experiences and other information for CCE, to provide support for the development of valuable networks/partnerships within and between communities.

ANNEX I

UNESCO INTERNATIONAL SEMINAR ON CLIMATE CHANGE EDUCATION 27-29 JULY 2009 AT UNESCO, PARIS

AGENDA

DAY 1: MONDAY 27TH JULY	
09h00 to 09:30	Registration
09h30 to 10h00 (Room IX) 10h00 to 10h30	Opening Koïchiro Matsuura, Director-General of UNESCO (15') Poul Erik Dam Kristensen – Ambassador of Denmark to UNESCO (15') Background and introduction to the seminar Patricio Bernal – Assistant Director General, Intergovernmental Oceanographic Commission, UNESCO – (10') Mark Richmond – Director, Division for the Coordination of United Nations Priorities in Education (10') Douglas Nakashima – Chief, Section for Small Islands and Indigenous Knowledge (10')
10h30 to 10h45 (Foyer)	Coffee
10h45 to 12.30 (Room IX)	Plenary I: Climate change – scientific, socio-economic, cultural, gender and ethical perspectives Moderator: Eduard Muller Keynote addresses: Climate Change and its complexities – Henriette Rasmussen (20') Climate Change, facts, impacts and global security – passing on the message to young people – Philip Chris Reid (20') Questions (15') Thematic Presentations: Climate ethics and justice – Johan Hattingh (10') Understanding climate change from a gender perspective: educational challenges – Irene Dankelman (10') Why do I have mangoes in July? – Gail Townsend (10') Questions (15')
12.30 to 14h00	Lunch
14h00 to 15h30 (Room IX)	Plenary II: Climate Change Education - A multi-faceted challenge Moderator: Heila Lotz Keynote addresses: Climate Change implications for SIDS – Leonard Nurse (15') Climate literacy and climate change education - Carol Young (15') Questions (10') Thematic Presentations: Climate change education for and in SIDS –Jeanette Larue (10') The United Nations Framework Convention on Climate Change and Education – Laurence Pollier (10') ESD and Climate Change Education – Philippe Saugier (10') Climate Change Education Campaign by the Ministry of Education in Denmark – Jens Dalsgaard (10') Questions (10')

15h30 to 15h45	Coffee
15h45 to 16h30 (Room IX)	Presentations profiling selected Climate Change Education Practices and Tools 'Climate Change' in Teaching and Learning for a Sustainable Future - Clayton White (10') Sandwatch - Gillian Cambers (10') Visualisation of Climate Change - Julia Hasler (10') Images from the Future - Carsten Skjoldborg (10')
16h30 to 17h30 (Room IX)	General Discussion Moderator: Charles Hopkins
17h30 to 18h30 (Room IX)	Screening of film 'Here to Stay' The new environmental documentary "Nous resterons sur Terre" or "Here to stay" featuring Green Cross International (GCI) founding President Mikhail Gorbachev as well as GCI Honorary Board Member Wangari Maathai, environmentalist James Lovelock and philosopher Edgar Morin. The film by filmmakers Olivier Bourgeois and Pierre Barougier looks at how humankind's state of harmony with the planet has become unbalanced, raising the issues of urban sprawl, extinct species, depletion of natural resources and global warming. More info: http://www.nousresteronssurterre.com/
18h30 to 19h30 (Foyer I, in front of Salle I on ground floor)	Welcome reception and viewing of exhibition 'How can we fight global warming locally?'

DAY 2: TUESDAY 28TH JULY

9.00 to 9.30 (Room IX)	Announcements Summary of Day 1 – Charles Hopkins
09h30 to 10h15 (Room IX)	Plenary III: Introductions to Thematic Working Groups Peter Dogse Working Group 1 - Integrating climate change education into educational policies, programmes and curricula Working Group 2 - Climate Change education tools, materials and good practices Working Group 3 - Mobilizing / engaging networks and partnerships for climate change education (more information on the themes and guidelines in annex document)
10h15 to 10h30	Coffee
10h30 to 13h00	Break into Thematic Working Groups Group 1 (Room IX) Group 2 (Room VII) Group 3 (Room VIII) For each Group Election of chair and rapporteur Organisation of work (e.g. brief presentations, discussions in view of key issues and expected outcomes for each thematic working group)
13h00 to 14h30	Lunch
14h30 to 16h00	Thematic Working Group Sessions cont'd

16h00 to 16h15	Coffee
16h15 to 17h00	Thematic Working Groups Sessions cont'd
1700 to 17h30	Plenary IV: Report to plenary on the three Thematic Working Groups Reports from 3 working groups General discussion and comments.
17h30 to 19h30	Drafting groups – to prepare outline/skeleton recommendations for each group

DAY 3: WEDNESDAY 29TH JULY

9h00 to 9h30	Announcements Brief reports from the drafting groups
9h30 to 10h45	Thematic Working Group Sessions cont'd
10h45 to 11h00	Coffee
11h00 to 13h00	Thematic Working Group Sessions Cont'd
13h00 to 14h30	Lunch
14h30 to 16h00 (Room IX)	Plenary V: Conclusions and reports from Thematic Working Group sessions
16h00 to 16h15	Coffee
16h15 to 17h15 (Room IX)	Plenary VI: Presentation of recommendations and discussion on follow-up action Closure
17h30 (Restaurant on 7th floor)	Cocktail reception

ANNEX II

UNESCO INTERNATIONAL SEMINAR ON CLIMATE CHANGE EDUCATION 27-29 JULY 2009 AT UNESCO, PARIS

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