



United Nations
Educational, Scientific and
Cultural Organization

Towards a Green Economy and Green Societies



UNESCO Future Forum

UNESCO Future Forum – Towards a Green Economy and Green Societies



UNESCO Future Forum

Towards a Green Economy and Green Societies

“Mitigating Climate Change – Building a Global Green Society”
UNESCO Headquarters, Paris
26 October 2009

“Moving Towards a Green Economy and Green Jobs”
Guiyang, China
22-23 August 2009

Towards a Green Economy and Green Societies

United Nations Educational, Scientific and Cultural Organization (UNESCO)
Bureau of Strategic Planning (BSP)

The authors are responsible for the choice and the presentation of the facts contained in this book and for the opinions expressed therein, which are not necessarily those of UNESCO and do not commit the Organization. The designations employed and the presentation of material throughout this publication do not imply the expression of any opinion whatsoever on the part of UNESCO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Published in 2011
by the United Nations Educational,
Scientific and Cultural Organization
7, place de Fontenoy, 75352 PARIS 07 SP

Composed and printed in the workshops of UNESCO

© UNESCO 2011

Cover photos: Rocky Roe, Sampubangin village, Papua New Guinea, © UNESCO 2006
Le Mignon, Misato, Windmill energy, windmill network, California, United States of
America © UNESCO

Printed in France

BSP-2011/WS/3 – CLD 1699.11

Table of Contents

Foreword by the Director-General	5
Presentation of the UNESCO Future Forums on the Green Economy and the Green Society	9
Part I: Mitigating Climate Change – Building a Green Global Society	11
Summary of the UNESCO Future Forum on the theme “Mitigating Climate Change – Building a Global Green society”	13
Introductory Remarks by Koichiro Matsuura	20
Keynote Address by Mario Amano	24
Keynote Address by Laurence Tubiana	30
Presentation by Edward Ayensu	36
Presentation by Lailai Li	40
Presentation by Fulai Sheng	46
Presentation by Kevin Watkins	50
Presentation by John Crowley	56
Part II: Moving Towards a Green Economy and Green Jobs “Preparing for a green future – the role of education and the knowledge society” by Hans d’Orville	61
Annex: Documents transmitted to UNESCO on the occasion of the UNESCO Future Forums on the Green Economy and Society	69
Message by Michel Jarraud	70
“Bridging the ecologies of cities and of nature” by Saskia Sassen	74



Irina BOKOVA

Director-General of UNESCO

Foreword

The world has recognized that unfettered economic development and continuous growth could in fact jeopardize humanity's future and that we need to dedicate ourselves collectively to sustainability.

It was this spirit that led the international community almost twenty years ago to adopt the Agenda 21 in Rio in 1992. The foundations of Agenda 21 were the principles of sustainable development formulated in the Brundtland Report – namely, 'a development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'

Agenda 21 was bold and forward-looking. It was also powerfully straightforward. Development was not to be judged only by the way it changed our present lives but also by its contribution to and impact on our common future and well-being. This has altered radically our approach to development and changed the way we think about it.

Today, as we face unprecedented environmental challenges such as climate change, biodiversity loss, pollution and resources scarcity, the time has come for an in-depth assessment of the progress achieved and shortcomings that remain in the implementation of Agenda 21.

It is clear that we need still to break with 'business as usual'. We need a renewed and common commitment to fostering new, innovative development models and practices. Addressing these concerns, the 'green economy' concept is expected to stimulate a new type of development, a different focus for economic growth and job creation, while promoting the efficient use of ecological resources and reducing environmental risks and greenhouse emissions.

At the same time, genuine sustainable development calls for more than green investment and low carbon technologies. Besides its economic and ecological dimensions, the social and human dimensions are central factors for success. Ultimately, we must focus our efforts on building 'green societies.'

For UNESCO, these are inclusive societies that give everyone equal access to essential living resources. They require a shift towards sustainable patterns of behaviours, attitudes and values, and call for mobilizing the knowledge and skills needed for a green economy. To sustain positive social transformations, sustainability policies must focus on the most vulnerable and marginalized populations, such as the poor, indigenous people and youth, while respecting the principles of gender equality.

To these ends, it is essential that we make the most the transformative power of education, sciences, culture, and communication. These are the ways to tackle the challenges we share and to promote a new international development agenda.

Oceans are an excellent example. UNESCO considers that oceans are pivotal for the transition to a green economy. Not only does the global value of marine and coastal resources and industries represent more than 5% of the global GDP, world oceans also drive the systems that make the world habitable for humankind. This is why I believe that improved global ocean governance is a prerequisite for sustaining ocean resources and for ensuring a sustainable future for the generations to come.

Securing access to safe drinking water for all and wisely managing our limited freshwater resources are also high priorities on the sustainable development agenda. In addressing the use and management of the world's freshwater reserves and the demands on these resources, UNESCO is working to help countries and local communities to identify critical problems and to assess their ability to cope with water-related stress. All of this contributes to the elaboration of evidence-based and well-informed water related policies.

Biodiversity must also be managed sustainably. UNESCO's vast network of Biosphere Reserves offers ideal laboratories to test and demonstrate innovative approaches to sustainable development. These reserves seek to reconcile the conservation of biological and cultural diversity and economic and social development through partnerships between people and nature.

The transition to a green economy will not be possible without well trained professionals able to tackle the challenges of globalization and to manage major socio-economic and environmental transformations.

Education is the fundamental lever for change. Education for sustainable development promotes the values and knowledge necessary to help women and men to cope with change, complexity and uncertainty, to adopt new consumption patterns, and to transform mindsets and behaviours. This is education for the future. Technical and vocational training is another important UNESCO orientation to provide young people and adults with the skills and competences needed to keep up with the requirements of the 21st century labour market -- with an emphasis on low carbon approaches.

To build human capacities, UNESCO underpins also national efforts to foster science, technology, engineering and innovation policies for sustainability. Renewable energy is fundamental here. UNESCO is supporting capacity building, research and development, and knowledge sharing in this area in order to change current processes of energy production and consumption.

Addressing the impact of climate change and undertaking climate adaptation and mitigation requires comprehensive, well-rounded policies. UNESCO's approach to these challenges is holistic – working from the scientific, educational, environmental and ethical angles, with an emphasis on the vulnerable segments of society, especially those living on coastal zones and small islands or in remote areas.

Our work includes promoting forward-looking approaches to development that are rooted in local cultures, in the knowledge and needs of the local populations, and the fostering of cultural diversity and intercultural dialogue. We seek to create enabling environments for development by cultivating social cohesion, tolerance, dialogue and, ultimately, peace. Foresight has a critical contribution to make in this regard.

Building green societies and green economies requires well-informed policy choices in favour of sustainable development. Strengthening the capacity of journalists to investigate, communicate and report on sustainable development issues is vital, as is promoting free, independent and pluralistic media to raise public awareness, commitment and solidarity. All of this is part of our work to establish a culture of dialogue that is essential for sustainability.

Education, sciences, culture, communication and information provide, therefore, the maps to underexplored horizons for sustainable development. These are fundamental pillars on which to build our common future. In these ways, UNESCO is working for a sustainable 21st century.

A handwritten signature in black ink, reading "Irina Bokova". The signature is fluid and cursive, with the first letter of each word being capitalized and prominent.

Irina Bokova
Director-General

Presentation of the UNESCO Future Forums on the Green Economy and the Green Society

In the face of the global environmental challenge and its manifold dimensions – climate change, biodiversity losses, water shortages, desertification, deforestations, unsustainable land uses –, the future needs a green economy and society.

The green economy is an economy based on sober and clean growth, but also an economy where investment in sciences and technology is essential. Sustainable development however calls for more than technical and economic measures. The green economy must be accompanied by the vision of a global green society.

The project of a green society rests on the resolute assertion of ethical and moral values. They should ultimately complement the political and economic pillars of the international response to environmental challenges. UNESCO is committed to stimulate the debate on these issues.

The Bureau of Strategic Planning has launched a reflection on the green economy and society throughout a series of its UNESCO Future Forum series, which aims at fostering the global reflection on key future-oriented issues in the domains of the Organization. The present book builds on two of those events, one organized in August 2009 Guiyang, China, on the theme “Moving Towards a Green Economy and Green Jobs” and the second organized in October 2009 at UNESCO headquarters, in Paris, on the theme “Mitigating Climate Change – Building a Global Green Society”.

For additional information, please contact:

c.descombris@unesco.org

j.plouin@unesco.org

Mitigating Climate Change – Building a Green Global Society

Summary of the contributions to the UNESCO Future Forum on the theme “Mitigating Climate Change – Building a Green Global Society”

Introductory remarks

Hans D’ORVILLE, the Assistant Director General for Strategic Planning, introduced the Future Forum quoting Secretary General of the United Nations, Mr Ban Ki-moon: “climate change is the defining challenge of our time”. Taking the case of the Small Island Developing States (SIDS), he noted that climate change is not a distant or abstract problem. He added that China’s decision to shift to a green economy was comparable to the launch of the Sputnik, which had sparked the space conquest. In conclusion, Mr d’Orville announced that this edition of the Future Forum was the first one of a series devoted to the green economy and society themes.



In the view of the Director General of UNESCO, **Koïchiro MATSUURA**, this edition of the Forum could not be timelier. It preceded the United Nations Climate Change Conference to be held in Copenhagen in a few weeks and it comes right after the closing of the 35th session of UNESCO’s General Conference which decided to examine the opportunity of issuing a universal declaration on the ethical principles of climate change. The Climate Change Conference in Copenhagen would probably produce a legal and regulatory environment. Nonetheless this framework would lack substance if growth itself was not deeply transformed and the world shifted to a green economy. Such a green economy would not just rely on cleaner processes; it would rely on massive knowledge-based investments. Basic sciences, research and innovation would play an essential role in reducing energy consumption and carbon emissions and establish green mass markets. A green economy would not be possible without Education for Sustainable Development (ESD). Because green jobs, many of them new, would be needed to man a green economy, intensive training would

be required in all areas. But, he insisted, this was only one aspect of ESD, which aimed at integrating in all forms of education and learning the principles, values and practices inherent to sustainable development. The objective was to meet the social, economic and environmental challenges of the twenty-first century and start a green society that is also a society of shared knowledge. Finally, to be sustainable, the project of a green economy could not rest on bases only technical and economic. It had to be accompanied by the resolute assertion of ethical and moral values which should ultimately complement the political and economic pillars of the international architecture on climate change. This was the rationale behind the project of a universal declaration on the ethical principles of climate change.

Keynote Speeches

According to evidence mentioned by **Mario AMANO**, Deputy Secretary General of OECD, the cost of climate change to society and the economy will be higher than the cost of the recent financial crisis. This calls for ambitious policy action: we must address the issue and not utilize the economic crisis as an excuse to delay action. Although many developed countries have committed to reduce greenhouse gas (GHG) emissions, national data still falls short of the reduction that the Intergovernmental Panel on Climate Change (IPCC) prescribes.

It was a positive sign that OECD recently countries asked for the development of a green growth strategy to help them put in place the right incentives and policy framework to encourage green recovery investments and to follow a low carbon pathway. In the long run, green-oriented taxes, including the removal of perverse subsidies, and pricing approaches such as carbon taxes and permits in cap-trade schemes were elements leading to green growth. There was a need to combine proactive policies to support green R&D investments, and help new technologies compete on a level plain field.

North-South flow of low-carbon technologies had to increase while taking into account the domestic public policies of recipient countries. Thus, development assistance and capacity-building could play an important role. Assistance should include capacity-building through education, training and international research cooperation.

OECD had developed an innovation strategy to help countries identify policies to mobilize innovation to achieve a range of economic and social objectives through a better understanding of the full cycle of innovation. Together with its green growth strategy, the OECD was also developing the analytical basis to help countries find new sources of economic growth in green technologies and to move towards a green economy.



Laurence TUBIANA, Director for Global Public Goods at the French Ministry of Foreign and European Affairs, stressed that, in the context of climate change discussions and negotiations, we chiefly needed to identify how to build a truly global green society. She called for a redefinition of modernity around less predatory development models.

A new social contract was needed, which would take into account both governments and non-government actors. Public action, which had been eroded in the recent decades, should be reinvented on different bases than those of the mid-century welfare-State. Governments should address market failures, of which climate change is the most blatant example. Bottom-up mobilization of civil society, NGOs, etc, would be indispensable in building a new society and create new spaces for public debate. A new international society would be needed, reflecting the new distribution of economic power. In her view, the most striking element in the climate crisis was that no previous model could be found anywhere, even in the industrial countries and that new ones would have to be invented from scratch: countries like India, China or SIDS were already proving to be active think tanks of the future.

In line with these propositions, she identified three domains of major interest for the coming years. Sovereignty would have to be redefined in a less centralized approach. To locally address this global issue, governments would have to build mutual trust and accept sovereignty limitations so that so to monitor each other's programmes against climate change. Second, it would be necessary to build an international knowledge space for knowledge sharing and intercultural dialogue, which would require a sort of Manhattan Project for climate change, a project that would include more than just technological aspects, though.



Welcoming that call to revisit our development paradigm, Hans d'Orville launched the **debate** with the audience. Answering to some of the questions, Laurence Tubiana noted that ideas and their wording are very important to consider in

global debates, especially in international negotiations. One positive aspect of our time, she added, was the very existence of the debate on climate change. There were skeptics of course, but no society was indifferent. According to her, civil society had to pressure politicians into creating long term planning mechanisms. She underlined that, in her personal view, building a green society rested on fundamental rights such as those covering access to water, health, education or energy.

According to Mr Amano described, OECD countries had the responsibility to disseminate cutting edge economic knowledge to solve the financial and climate crises and to address the needs of developing countries, while acknowledging that everyone has to act. As for OECD's approach to energies, he affirmed that environmentally damaging options should not be rewarded.

.....

Concluding the first part of the Forum, **Marcio BARBOSA**, the Deputy Director General of UNESCO, asked the two keynote speakers what would happen after the climate conference in Copenhagen. To Mrs. Tubiana, we were faced with a positive scenario and a negative one. In the positive one, there would be an international agreement signalling future progress to be expected in three areas: significant efforts by the industrialized countries; emerging countries accepting to reduce their absolute levels of emissions; substantial financial mechanisms to assist developing economies and effective technological transfer mechanisms (which would actually be the easier aspect of the problem). Mr Amano was of the opinion that the Copenhagen conference should be seen as a stage imperative to achieve an agreed upon percentage of reductions and integrate green elements into economic packages.

.....

Edward AYENSU, Chairman of the Ghanaian Council for Scientific and Industrial Research (CSIR) ascribed two roles to a global green society. Firstly, the lay public needed to be explained what climate change meant and implied for their daily life. This called for the nationally adapted development of clear information on the environment and low-carbon and biodiversity plans. African governments had to develop such plans. Secondly, he insisted on the positive role an ecological footprint assessment would have in the building of a green society. A global ecological plan was needed. He noted that most of the rapidly developing countries had plans at hand. Unfortunately, while poorer developing countries needed them the most, they did not have the adequate capacity and

financial resources to afford them. Concluding his remarks, he urged the biggest polluters to help the developing countries.

.....

Lailai LI, Deputy Director of Stockholm Environment Institute (Sweden) presented a joint research study conducted jointly by the Stockholm Environment Institute and the Chinese Economists 50 Forum. She argued that with mitigation estimated to cost US\$100 billion each year, global targets necessitated large joint mitigation programmes involving both developed and developing countries, who had immense needs in terms of technology transfers. She regretted that the current global mitigation mechanism was not effective since the Clean Development Mechanism (CDM) was marginal in the global carbon market, technology transfer were low, and the “cap and trade” regime prevented developing countries from participating in the global carbon market. To meet reduction targets, China undertook the world’s largest climate change mitigation programme aiming at reducing energy intensity by 20 %and pollution intensity by 10 %. But this intensity-based programmed was not recognized by the current cap-trade regime.

A new framework, the Inter-country joint mitigation plan (ICP), was proposed as a middle-ground mechanism based on bilateral or multilateral agreements. In that framework, developing countries would commit to emissions reduction while developed countries would commit to technology transfers. ICPs had 3 pre-conditions: voluntary targets from developing countries, international standards of control and the setting up of an international fund. A UN body would play a role in the ICPs, assessing ICP proposals, supporting and facilitating negotiations, and evaluating their implementation. In the long run, ICPs had the potential to bridge mitigation objectives and economic performance.

.....

Fulai SHENG began his presentation with a brief introduction to the Green Economy Initiative (GEI) launched by the United Nations Environment Programme (UNEP) to encourage and enable governments to increase their investments in green sectors supported by policy and institutional reforms. He then laid out some initiatives that UNESCO could undertake in working towards the creation of a green economy: climate-related civic education, guide recommending low-carbon ideas to the lay public, climate science popularization, innovation in the social sciences, exploration and dissemination of traditional practices which can help preserve the environment.

.....

Kevin WATKINS began his intervention by asserting that humanity was actually moving in a direction that was far worse than anticipated. However, he believed that painting apocalyptic scenarios diverted our attention from the fact that, in the eyes of illiterate people living with less than one or two US dollars a day, climate change was not a future perspective worse than their present misery. Education experts had to communicate on their plight and the need to address it if we hoped to obtain a truly global momentum behind the climate change agenda. In this regard, the school curriculum was crucial to educate the current and future generations. We needed to reflect deeper on our ethical responsibilities, which should be at the centre of the climate change agenda so as to create a sense of solidarity, especially in favour of developing countries in Africa, who needed significant financial and technological support.

.....

John CROWLEY noted that the word green was often used as a placeholder, without a clear sense of what should be done, when, how, by whom, for whom and why. The real difficulty was that “green” covered problems of an immense scale. This resulted in uncertainties first about the meaning of green and the humankind’s place – central or peripheral? – in nature and, second, about the notion of responsibility, the meaning of which may greatly vary depending on whether we consider long term consequences of our actions or not. There was no guaranty that an assemblage of green actions would produce a green society. In his opinion, we needed to answer the question “what is value and collective action?” in a new conceptual framework, one that differed from the ideas of the Enlightenment and Industrial Revolution eras that were still with us. He added that no solution would be achievable that did not take into account the plurality of views worldwide and the uncertainty that lies at the heart of environmental challenges. He concluded that, from UNESCO’s perspective, the whole point of sustainability was to connect ethics and politics.

.....

In the ensuing **debate** questions were asked about the linkage of growth and environmental concerns and the needs of developing countries. Mr Sheng described growth as having two dimensions, one that was bad for the environment, one that was good for the environment. Thus, it was not practical to tell developing countries that they should limit their production when there remained a lot of room for green patterns of good growth. The debates needed, in his view, to shift to the positive nexus of the economy and the environment. Developing countries had, in Mr Ayensu’s opinion, the advantage of a late start. Most of them were not engulfed in waste. In terms of growth, developing

countries had the biggest potential to create new markets. Africa was trying to unlock its future, but its natural resources were being spirited away with no real return to the people. Mrs. Li explained that carbon taxes should act as a signal of the need to move towards a decoupling of growth and environmental damages. She added that the contradiction was not between growth and green, but between what each and every one advocates and what we does. Mr Watkins noted that the main challenge we were faced with was to get out of a production mode that had been based on fossil energy for two centuries. Endorsing Mrs. Tubiana's idea of Manhattan Project for climate change, he stressed that the task was a collective and an international one with scientific, technical and ethical dimensions. There was also a need for financial institutions and mechanisms to channel financial resources to the developing countries. Mr Crowley warned of the risks inherent to system thinking. It would be misleading to look for one and only system to replace the current one: more attention should be given to pluralist and participative approaches. In his view, international negotiations on environmental problems would fail if they tried to achieve one and only solutions, because that type of problem could not be simplified. What they should rather do is help with the local solution to problems that, in the end, have local consequences.





Koïchiro MATSUURA

Former Director-General of UNESCO
(1999 to 2009)

would like to begin by stressing how well timed these discussions are for UNESCO for two reasons. Firstly, they are being held shortly before the much anticipated United Nations Conference on Climate Change to be held in Copenhagen in a few weeks time, and secondly, the General Conference has just asked UNESCO to strengthen its specialized capacity regarding climate change, both through its Strategy for Action and by preparing a report on the desirability of preparing a universal declaration of ethical principles in relation to climate change.

By virtue of its mandate, UNESCO is interested in the scientific, educational and cultural aspects of climate change and sustainable development issues. We are therefore more than ever open to your thoughts, analysis and suggestions. The Copenhagen talks in December 2009 will aspire to several goals: reaching agreement on specific measures to help the poorest and most vulnerable adapt to the consequences of climate change; setting ambitious goals for industrialized countries to reduce greenhouse gas emissions, and implementing measures for developing countries that fit individual needs and come with assistance mechanisms.

These talks can only truly make sense though if the global economy itself undergoes dramatic changes – the changes needed to become a “green economy”. Acknowledging this is important now in order to face the dangers posed not only by climate change but by various environmental crises – decreasing biodiversity, multiple forms of pollution and ocean degradation.

Like United Nations Secretary-General Ban Ki-moon, we should be pleased that at the Summit on Climate Change held in New York in September 2009, 100 heads of State and Government “recognized the need for an agreement all nations can embrace, in line with their capabilities – consistent with what science requires – grounded in ‘green jobs’ and ‘green growth’, the lifeline of the twenty-first century.” Similarly, in June 2009, United Nations agencies launched the Green Economy Initiative (GEI), designed in particular to assist poor countries in financing sustainable energy systems and economies that can withstand climate change.

Paradoxically, the scale of the 2008 global economic and financial crisis paved the way towards building a green economy. In September 2009, Heads of State and Government at the G20 Summit in Pittsburgh pledged to “turn the page on an era of irresponsibility” not only by reshaping the architecture of international finance and strengthening their support for social sectors which help the most vulnerable, but also by propelling our economies “toward greener, more sustainable growth.” Synergies now exist between the green growth model and strategies for emerging from the global financial crisis. It is clear, for example, that creating a green economy will only be feasible if production and consumption habits are completely overhauled. A switch is needed to an economy based on green goods and services that emits less carbon and uses fewer natural resources.

The switch to a green economy will also require heavy investment in knowledge. The green economy is, importantly, a knowledge-based economy in which research and innovation play a central role in reducing energy consumption and carbon emissions and building green mass markets. Basic science will play an essential role in observing, analysing and anticipating the behaviour of natural systems in a wide range of fields such as climatology, geology, biology, physics and ecology. Without it, we would be deprived of reference points and even more likely to worsen emerging problems precisely because we have no reliable scientific information on the environment in general and climate change in particular.

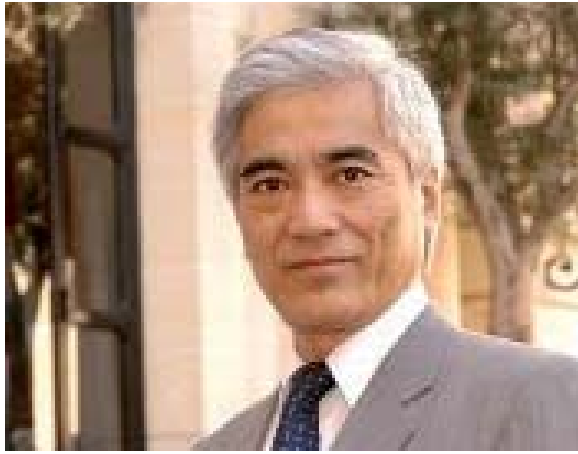
Science will also be at the heart of the decisions to be taken. This last point was particularly stressed by the ministers from around the world who spoke at the ministerial round table on ocean governance, held in October 2009 during UNESCO’s General Conference. In their view, knowledge and technology transfer will be crucial in helping developing countries face climate change and adapt to its effects. I would add that the green economy must also be based on an equitable sharing of knowledge and the creation of international networks and platforms which meet the needs of all, especially scientific needs, whether in terms of the climate, oceans, biodiversity or forms of pollution. It is by building knowledge societies that are equitable, inclusive and pluralist that we will be capable of driving truly green growth.

As you are no doubt aware, our Organization is lead agency for the United Nations Decade of Education for Sustainable Development (2005-2014). In my view, a green economy is clearly not possible without real efforts to educate people on

sustainable development. Choosing green growth is only possible if we recognize the need for jobs that are green, which will require large-scale training in every field, from industry, agriculture and food to construction and transport. To bring green growth to life then, we need to invest in training, especially vocational and technical education. If geared toward a green economy, this will contribute significantly to promoting a country's green growth, reducing poverty and ensuring the social and economic integration of marginalized communities. Work is also needed on the content and quality of this training, by incorporating the principles, values and practices intrinsically linked to sustainable development in all forms of education and learning. This will allow people to make informed choices for society that are adapted to their cultural environments.

Education for sustainable development is not then only about knowledge. It is also – and above all – about transmitting and spreading values. As the G20 leaders announced in their Statement at Pittsburgh, the future can only be built on “fundamental principles” such as a responsibility to conserve the environment, address the challenge of climate change, and invest in people and education. The current global crises have an ethical and moral dimension to them. This message was widely stressed by ministers speaking at the Plenary Ministerial Forum held at the General Conference in October 2009. This same message might be at the heart of a future draft universal declaration of ethical principles in relation to climate change. Such a declaration, the desirability of which we will examine at the request of Member States, might commit governments and societies to follow specific ethical standards when deciding how to fight climate change.

I should like to conclude this presentation by reminding you that in order to be sustainable, a project for a green economy cannot be based on technical and economical aspects alone: it must be accompanied by a solid commitment to ethical and moral values intended to eventually add to the political and economic pillars of any future international structure dedicated to climate change. UNESCO is pleased to be able to engage in this debate with you today.



Mario AMANO

Mario Amano (Japan) is Deputy Secretary-General of the Organisation for Economic Co-operation and Development

He is in charge of Environment, the Development Cluster, the Policy Coherence dossier, G8 Co-ordination and the Executive Committee.

Prior to joining the OECD, Amano was Acting Executive Director of the Korean Peninsula Energy Development Organization from 2004-2007. During his career as a Japanese Foreign Affairs Official, Mr Amano worked on policy issues in the areas of macroeconomic management, trade frictions, development aid, foreign investment, environment and energy.

In 1988-1989, Mr Amano was in the Permanent Delegation of Japan to the OECD, where he covered the Council, Budget Committee and Ministerial Meetings.

Mr Amano has an economics degree from the University of Tokyo and a Special Diploma in Social Studies from University of Oxford.

It is a great pleasure to be here to participate in UNESCO's Future Forum, "Mitigating climate Change- Building a Global Green Society".

I would like to share with you some OECD messages on policies to mitigate climate change at least cost, and on how countries can promote a green recovery from the economic crisis in the short-term, and a transition towards a low-carbon economy in the long-run.

1. The cost of inaction is high

The cost of inaction on climate change is high – in fact, there is evidence that suggests the costs of climate change to society and the economy would be much higher than the costs of the recent financial crisis. Without new policy action, the OECD projects that world greenhouse gas (GHG) emissions would increase by about 70% by 2050, and continue to rise thereafter. This would lead to a rise in world temperatures of 4°C to 6°C by 2100. Given the high costs and consequences of further climate change, ambitious policy action to address climate change makes economic sense.

Many developed countries have committed to reduce GHG emissions in the near-term, but the combined effect of the developed country targets would only cut their emissions by about 8-14 % by 2020 compared with 1990 levels. This falls short of the 25 to 40 % reduction that the Intergovernmental Panel on Climate Change (IPCC) tells us is needed for developed countries to prevent temperatures from rising by more than 2°C. So we need more ambitious targets as well as policies to fight climate change. We have already seen some movement in this direction, with the new Japanese government indicating it will increase their declared target to a reduction of 25% of emissions from 1990 levels by 2020 (instead of -8%), and Norway indicating it will increase its 2020 target from – 30 % of emissions compared with 1990 to – 40 %. These are positive steps.

2. Towards green growth

The challenge of fighting climate change may seem even greater now, as countries struggle to recover from recession and rebuild their economies. But the economic crisis is no excuse to delay action on climate change. Such delay would only increase the global costs to be faced in the future. Instead, ambitious policies to move toward a low-carbon economy should be an essential element in the strategy to recover from the crisis.

At the OECD Ministerial Council Meeting last June, Ministers of Economy, Finance, Trade, and Foreign Affairs from thirty-four countries asked the OECD to develop a Green Growth Strategy. The idea is to help countries to put in place the right incentives and policy frameworks to encourage investments for green recovery and to put us on a low-carbon growth pathway.

In the short-term, we need to look for win-win opportunities for both economic recovery and the environment. Many countries are directly investing through their stimulus packages in cleaner, low-carbon transport and energy systems, energy efficiency in buildings, as well as in green R&D. For example, Korea's "Green New Deal" allocates an unusually high share of its stimulus package to "green" elements, for example investments in green transport, and tax breaks and loans to help households move towards less environmentally damaging consumption choices.

However, some countries' stimulus packages include measures with potentially negative or at least questionable environmental impacts, for example, car-scrappping programmes, support to the automobile industry, and reductions in electricity prices, fuel charges and road tolls. In some cases, such measures could lead to increased emissions and pollution, so their full environmental impacts should be carefully assessed. To address some of these concerns, several countries, including Australia, Brazil, France, Germany, Italy, Japan, Korea, Portugal, Spain, Sweden, the UK and US, have at least partially tied support for the automobile sector to the development of cleaner vehicles.

In the long-term, green tax reforms and price-based approaches – such as carbon taxes and auctioned permits in cap-and-trade schemes – are one element of necessary policy reforms for green growth. These measures can also bring in revenues, which can be used to offset reductions in other taxes, for

example on labour, or contribute to fiscal consolidation. Several OECD countries including the Czech Republic, Denmark, Finland, Germany, Sweden, and the UK are already moving towards “green” taxation in the context of their economic recovery plans, and France is introducing a carbon tax to capture the emission not covered already under the EU emissions trading scheme.

Another key element in policy reforms for green growth is to remove environmentally harmful subsidies, especially for fossil fuel based energy. G20 country leaders recently agreed to phase-out such subsidies over the medium term. This will save money for governments and taxpayers, shift the economy away from carbon-intensive activities and increase overall economic efficiency. New OECD analysis using data from International Energy Agency shows that removing energy consumption subsidies in some emerging economies could drastically reduce global greenhouse gas emissions by 10 % in 2050, and by as much as 30 % compared with business-as-usual in some countries. This type of win-win action is an essential part of a cost-effective policy mix to meet global climate goals. For example, the Indonesian government has already taken action to cut subsidies for fossil fuels, and is considering further subsidy phase-out, and requiring its state electricity firm to use renewable energy sources.

3. Encouraging innovation and transfer of low-carbon technologies

Carbon pricing will be a key element of a flexible, least-cost approach to climate change. No green technology revolution is possible without a credible global carbon price. This is because investors need price signals to know that it is worth developing technologies for a green future. Putting a price on carbon emissions, for example through taxes or cap-and-trade schemes, will penalise carbon-intensive technologies and provide the strongest incentives and help create markets for the development and diffusion of low-carbon technologies such as solar and wind energy and carbon capture and storage. The latest OECD analysis shows that carbon pricing that aims to stabilise greenhouse gas concentrations in the atmosphere at moderate levels could provide incentives for a four-fold increase in world energy R&D spending by 2050.

But carbon pricing alone will not be enough. We need a mix of policies to support investment in green R&D and to help new technologies compete on a level playing field, as well as targeted standards (e.g. building codes, electric

appliance standards). Proactive public R&D policies are particularly important now, when the private sector may have more difficulty making such investments themselves. Governments will have to invest in research and development and in demonstration and deployment projects. However, OECD government expenditures on energy-related R&D have been falling steadily since the early 1980s as share of total R&D spending and as a share of GDP. The specific share of clean energy technology R&D is still low, with OECD governments committing only USD 3.6 billion to energy efficiency and renewable energy R&D in 2008 (according to OECD's sister organisation, the International Energy Agency). R&D in clean energy technologies is one area where public spending must be increased.

There is a need to increase and accelerate the North-South flow of low-carbon technologies in order for the international community to successfully fight climate change. While international co-operation is vital in facilitating development and transfer of low-carbon technologies, domestic public policies in recipient countries matter as well. Since one of the important drivers of technology transfer is the development of domestic innovation capacity, support for R&D capacity in developing countries is key, and development assistance and capacity building can play an important role in this regard.

However, mechanisms that balance the interests of both technology innovators and developing countries are also needed. The costs of access to technologies by developing countries could be subsidised in specific circumstances, for example when there are overlapping patents on complementary components and inputs. In such cases transaction costs are very high, and financing of intellectual property-related costs (e.g., application, examination, and registration fees) could be subsidised if it helps to increase technology transfer. Support should also include capacity building (e.g. through education, training, and international research cooperation) where there are fears that intellectual property regimes may not be respected.

4. In closing ...

As we move towards a low-carbon future, the transition will need to be managed carefully to address social and competitiveness impacts, and to take advantage of the new business opportunities. This is an economy-wide challenge. Governments, businesses and consumers need to play their part to implement

the ambitious policy reforms to deliver environmental improvements in cost-effective and socially responsible ways.

The OECD has developed an Innovation Strategy to help countries identify policies to mobilise innovation to achieve a range of economic and social objectives, through a better understanding of the full cycle of innovation. Together with the OECD Green Growth Strategy – which will help governments identify policies that can achieve clean, low-carbon growth – the OECD is developing the analytical basis to help countries find new sources of economic growth in “green” technologies and to move towards a green economy.



Laurence TUBIANA

Laurence Tubiana (France) is founder of the Institute for Sustainable Development and International Relations (IDDRI) in Paris. She is also professor and director of the Sustainable Development Center at Sciences Po Paris. She helped set up the direction of Global Public Goods of the French Ministry of Foreign and European Affairs. She follows and participates in the international negotiations on climate change, in which IDDRI is highly involved.

She is member of several scientific boards of main research institutions such as the French Agricultural Research Centre for International Development (CIRAD), the Indian Sustainable Development Council and the China Council for International Cooperation on Environment and Development.

Founder of the journal *Le Courrier de la Planète*, she published a number of articles and books on environment, development and international issues. Since 2007, she has co-directed the publication of the annual review *Sustainable Development in Action – A Planet for Life*.

Laurence Tubiana studied at the Institut d'Etudes Politiques de Paris and holds a PhD in economics.

would like to thank UNESCO for providing such an opportunity to reflect on the concepts of a global green society and green growth for the whole world. After the comprehensive briefing by the Secretary General of the OECD, I can take a step back and develop some ideas about the scope of the change that awaits national societies as well as the global society.

Because of my professional duties, climate change negotiations are my daily business, which sometimes prevents us negotiators from reflecting on the directions we are taking. Negotiators meet regularly around the world to argue on the distribution of efforts between developed and developing countries, on the funding to be conceded by the rich countries, on the impact and severity of climate change for the most vulnerable economies. During these very difficult negotiations, we often forget that the overall aim is not only a battle between potential winners and losers, but the fact that we have to work together to change society. Negotiators do not often dream about the future, but it is important that prospective reflections take place to enlarge our perspectives before our meeting in Copenhagen. We are negotiating for a coordinated and a concerted response of all the societies in the world to the phenomena created by us before it is too late. The time for reflection offered by the Forum of the Future is very welcome before returning to the negotiation table.

The title of this forum is highly relevant as we are asked to reflect on the possibility of a global green society – these two terms, “society” and “global”, are central to our concerns. Climate change is indeed an indicator of the obsolescence of the development model we elaborated over a century. It is an indicator because it represents the most serious risk that human societies incur today. But it is pointing to one risk among others. We must not forget all those other phenomena that we caused through that same economic development model: losses of biodiversity, degradation of water resources, increased desertification, which are also expressions of this obsolescence of our development model. The combination of increasing world population and the dissemination of a model of development that preys on natural resources has found its limits. Climate change is the indicator of this impasse.

We have a choice to make. Either we let the disturbances occur and the survival of human species – as we know it at least – is at stake, or we succeed in controlling these disturbances and we strive to build a new society and development model on other grounds than the increased use of natural resources. We will then have to accept an alternative vision of modernity. We need to redefine a set of paradigms with which we have been operating for over a century.

The construction of a new society is a very complex endeavour. It calls for a new social pact. Everyone must contribute – in his or her political and cultural area, as well as in his or her national system, because it still falls upon nations to organize the discussion of such pacts even if today they reach far beyond national borders and territories. But we also need to think about a development model based on greater equity and a more sober use of natural resources. We must find a new definition of wealth and well-being. All this is possible only on the basis of a new social pact.

The green society imperative calls for a major renewal of public action. For almost thirty years, the various economies have engaged in a process of public policy reduction parallel to economic integration and globalization processes in which we are embedded and which produced positive results as well as large failures. It is time to redefine public policy in the light of these new challenges, which pertain to long-term issues and call into question the relationship between human societies and nature. The assessment of what has been done over the last thirty years calls to redefine public policy. This redefinition of public action has nothing to do with what we have done for the past 60 years, including the Welfare State. Renewal requires the definition of a framework that seeks long-term impacts, one that sends economic actors the signals necessary to transform the economy and ask them to significantly reconsider their investment patterns. It entails the development of new rules and standards for the provision of public goods and, in particular, the elaboration of the new regulations aimed at correcting market failures that occur today on a global scale. Climate change is certainly the most obvious failure of the global market.

The Copenhagen negotiations contribute to the establishment of this new framework. I am convinced that the December agreement will reflect this evolution, even if we are actually still dealing with national regulations that are more or less coordinated rather than integrated in a truly global framework, hence the difficulty of the exercise we face.

In this renewal of society and the definition of a new social pact, the civil society is pivotal, Non-Governmental Organizations (NGOs), businesses, local governments, citizens. You cannot build without these actors. A profound transformation of the economy cannot be triggered in a top-down approach with no debate. Such a change cannot be imposed from above. The most centralized governments in the world will not be able to promote behavioural changes if there is no public debate takes place and no collective vision for rethinking modernity. Such a vision cannot trickle from above. When analyzing the industrial revolutions, we can see that these movements spontaneously came from the societies. These revolutions have been encouraged by governments and elites, but they always resulted from deep societal dynamics. We cannot proceed otherwise. It is important to accelerate the discussions for the transformation to take place.

We can thus already identify three preconditions required for green societies to emerge: a renewal of public action, a new social pact and a new space for public debate.

We must also insist on the fact that the society in question is a new international society. Each day strikingly brings its share of surprises. It is thus striking to observe that the United States are back in the field of multilateral debate and that this great country no longer has the natural leadership it had held since 1948. We are witnessing a redefinition of international relations. This trend can be witnessed in other areas of the international community, but it is particularly notable in the climate change discussion because its point is not to suggest solutions to others. We need to develop solutions tailored to local and national situations. From this point of view, the major developing countries have taken the lead in this area since there is no development model to be disseminated from Washington, London or Paris. There is no such thing. The old industrialized countries have proposed nothing that resembles a global green society. We need to invent this society, which is what the major developing countries are actually doing.

One cannot but be struck by the intensity and quality of the debate on climate change in India, China, South Africa, Brazil or in smaller or less economically strong countries. There are very few countries where we do not discuss this issue and policies to address them. India is a case in point. While, at the G8 in Aquila in July 2009, the Prime Minister of India, dismissed the emerging consensus, which is not yet widespread, trying to limit the increase in global

temperature 2° C, a strong protest nonetheless followed his agreeing to affix his signature to the final communiqué of the Summit. Simply showing one-self ready to accept a maximum level of warming – or creating the best conditions for it, I would say – had already strong implications as to the carbon space left for developing countries. India has thus opened an ongoing debate on whether the issue of climate change should lead to alter the Indian growth pattern and the instruments on which it rests. In this great democratic country, media, politicians, NGOs continue to discuss the centre of gravity change.

We are witnessing the same thing in China, where the leadership has completely changed its position in a two year-span. When, five years ago, I began to participate in the Chinese Committee on Sustainable Development and Environment, the objective was “Four China for 2020”. That kind of growth is now out of the question: the current debates revolve around sustainability and low carbon growth. These readjustments do result from an intense internal discussion about the kind of development model China should pursue. There are therefore players, in this new geopolitical climate, who are envisioning the future, just as the older industrialized countries. This is a profound change.

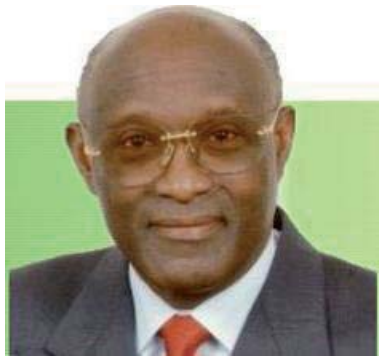
It should be added that large developing countries are not alone in spearheading the renewal of the international scene. Small Island Developing States (SIDS), Mr Matsuura referred to them in his introductory remarks, are gaining influence in the international debate. Admittedly, these are only “micro-actors” and most of the discussions in Copenhagen will be between the major developed and developing countries. But the voice of the most vulnerable economies, such as SIDS and countries in sub-Saharan Africa, will be listened to, because the discussion of the impacts they will suffer and are suffering already, can not be ruled out of international debate.

Two other major areas must define the new international society if it is to become a global green society. We first need a complete redefinition of sovereignty. National states are obviously jealous of their privileges. This raises a major issue in negotiations on climate, because we have no world government to force all the countries to transform their economy into a low carbon economy. The challenge will not be only to identify what measures are needed to initiate this transformation, but to create confidence. To create trust, we must watch what others are doing and be able, at any time, to check whether the world is on track for limiting emissions. This involves monitoring, reporting and verification mechanisms. Coordination should focus on what makes the core of national

policies: energy, transport, urban development, agriculture. It is always very difficult to step into these eminently national discussions national and even more so with climate change, which requires that we envisage all these policies together. It is therefore necessary that the international community collectively agrees to redefine sovereignty so as to meet this common goal while protecting the autonomy of the choices related to these new social contracts that I mentioned in my opening remarks.

Secondly, the global green society requires building a space of cooperation for knowledge generation. Without knowledge, we cannot elaborate the public policies that will accompany or accelerate the desired changes. This area of international cooperation on knowledge and culture is partly built – UNESCO's existence testifies to it – but its dimensions must be expanded. The technological revolution to address climate change is often compared to the Manhattan Project: it requires a strong capacity to mobilize for a goal. It should be noted immediately that such a project, besides being peace-oriented, must go far beyond technological innovation. It must involve changes both in technology and behaviour. We must develop and disseminate innovations in all sectors of society. Such a collective enterprise has never been undertaken. It depends on the creative effort of every individual and the institutions that will accompany this change.

Finally, we must have regard to the role by the international institutions created after World War II, which include UNESCO. Their mission was to foster the deployment of development in all the countries of the planet and deploy a conception of modernity based on fairness. Born on the rubble of the Second World War, this vision of modernity was driven by institutions that now affect all sectors, from the economy to culture, and are very precious to drive change. But these institutions must completely review their approaches and paradigms to support the transformation of societies within Nation-States but also within the framework of this renewed international society. This transformation must happen fast, because we now have less than ten years to initiate a global change in our patterns of production and consumption.



Edward AYENSU

Professor Edward Solomon Ayensu, formerly Chairman of the World Bank Inspection Panel, is Chairman of the Council for Scientific and Industrial Research (CSIR) Ghana

He was a member of the Energy Commission at the World Bank at the inception of the development of the West African Gas Pipeline. He is a Member of the Board of Trustees of the UN University for Peace and a Member of the Advisory Board of the Sustainable Forestry Management Limited (SFM). He was Director and Senior Scientist during his 20 years at the Smithsonian Institution. He has served as a Member and international Vice President of the Board of Directors of the International Institute for Sustainable Development (IISD) in Canada.

An old Achimotan, he obtained his doctorate degree from the University of London in the Biological Sciences and was appointed a Visiting Fellow at Wolfson College, Oxford University.

It is highly timely for UNESCO to organize a foresight conference on the theme of the green society. We all aspire to such societies as they represent a path through which climate change can be mitigated collectively. The challenge is formidable though. The scientific community has recently explained to the lay public that the quantity of CO₂ we need to remove from the atmosphere amounts to some 17 gigatons of carbon if we want to reduce the global temperature by 2°C. This proposition is not easy to fathom, let alone act upon. Even the best minds have difficulties understanding the scale of the problem - but the truth of the matter is that the problem is very real. We need to accomplish that in order to even have green society to hope for in the first place.

My brief presentation will focus on two points. The first is that we cannot achieve a green society when the status of the environments in which we live is uncertain to us. It is thus undeniable that each and every country must have a low carbon growth plan. Without such plans, most of the current discussions are pointless since we need to know where we stand before we can do anything. This is a key issue I am trying to promote in African countries so that every one of them can develop a low carbon growth plan, without which it is impossible to conduct mitigation exercises or engage into serious adaptation programme. As we approach the Copenhagen Conference, it is obvious to many observers that a meeting of the minds on climate change is highly improbable. Nonetheless, it is my hope that an agreement on fundamentals can be reached, the first of which being a universally accepted low carbon growth plan. My second point is that we need to have an ecological footprint plan of a sort. Measuring our ecological footprint is an indispensable foundation of green societies. Properly developing such plans country by country would be instrumental in providing us with a baseline likely to put us on the path towards green societies.

Most of the countries, especially the rapidly developing countries, the recently developed countries and of course the industrialized countries have such plans at hand. The people who need it most, though, are those who are going to suffer

the most under the current circumstances. The very people I have in mind are those who live in the tropical developing countries. Therefore, I hope that, even if nothing substantial comes out of the Copenhagen Conference, the developing countries and the developed countries should at least agree that every country has such plans at hand.

An objective of that nature is achievable. This was done for biodiversity twenty years ago in preparation of the Rio Conference, for which every country had developed a biodiversity plan. Since it has been done already, it can be done again. My conviction is that the developed countries, who are the biggest polluters could help the developing countries achieve the goals that should be the first concern before we envisage any post-Copenhagen activities.



Lailai Li

Deputy Director of the Stockholm Environment Institute

Before joining Stockholm Environment Institute, Dr Lailai Li was director of the Programme of Leadership for Environment and Development (LEAD) and the Institute for Environment and Development in Beijing (IED), a Chinese NGO which she founded in 1994. Over the last decade, she has been studying and generating solutions to poverty and environmental degradation in the field, through capacity building, information dissemination, program development and inducing institutional and policy changes. Since 2000, she has focused on research on Corporate Social Responsibility and promoting it amongst Chinese small and medium enterprises. She sits on the Board of Trustees of the International Institute for Environment and Development (IIED), the Board of Directors of China Environment Protection Foundation, and is a council member of Earth Charter International. She holds a doctorate in sociology from the University of Pittsburgh in the United States and was a research fellow at the Institute of Sociology and Anthropology at Peking University before starting IED.

This presentation is based on the results of a research jointly conducted by the Stockholm Environment Institute and the Chinese Economists 50 Forum, which is made up of leading Chinese economists who had actually not touched the issue of climate change before launching this project. I will focus on four questions. The first concerns the global targets which require large mitigation actions; the second question regards the current global mechanism, the limits of which I will also examine; thirdly, I will present the Inter-country joint mitigation plan (ICP); finally, I will demonstrate how the ICP succeeds in meeting the requirements of both the economy and climate change mitigation.

Climate change mitigation is a process that features a diversity of factual elements. Concentration of greenhouse gases emission (GHG), which have grown up to over 430 part per million (ppm) of CO₂-equivalent (CO₂e) as of today, are being added at a rate of 2.5ppm per year. Developed countries are responsible for 70% of the CO₂ accumulated in the atmosphere. On the other hand, developing countries are catching up and are already making up more than 50 % of current emissions. China, for example, has already surpassed the world average level which is around 6 tons per person. In order to reduce poverty, developing countries need to accelerate their economic development at the same time that climate change is hitting the poor first and the most. According to Nicholas Stern, the author of the Economics of Climate Change, GHG concentrations must remain under a threshold of 500 ppm CO₂e, a global target which requires bringing emissions down to below 20 Gt CO₂e, around 50% of the 1990 and 2000 levels.

Given the dynamics of the world population, which will likely reach or exceed 9 billion by 2050, emissions have to be limited around 2 tons per person. This calls for large scale reduction programmes as well as joint collective actions from both developed and developing countries. These actions are now at the centre of the global debate on climate change. Ambitious joint actions will be all the more urgent that mitigation is actually estimated to require 100 billion US dollars every year as well as an aggressive dissemination and deployment of available and new technologies. Technologies are essential: developing have an absolute need of them. Given their legitimate right to growth, developing countries could

significantly benefit from a shift to a low-carbon growth path. While most analysts and policy-makers obviously agree on the relevance of this objective, the real questions remain to be answered. Who will finance this shift? Where will the funding come from? How can we bridge climate change mitigation with the shift to a large-scale carbon economy?

Let us now turn briefly to the current global mitigation mechanism and examine how it works in facilitating or constraining this change. The Bali action plan to combat climate change rests on the four pillars of mitigation, adaptation, finance and technology. The analysis of the current global mitigation mechanisms shows that the Clean Development Mechanism (CDM) is the only mechanism allowing Annex 1 countries (developed nations and nations with economies in transition) and non-Annex 1 countries to take joint actions against emission reduction. Unfortunately, CDM remains marginal in the global carbon market, of which primary CDM represented 19 % in 2006 a proportion that even dropped to 12 % in 2007. It is noteworthy that 70 % of the carbon market is made up of the emissions trading system of the European Union.

Developing countries are prevented from joining or participating in the global carbon market by the current carbon trade regime where technology transfers are extremely low. Great disparities can be found between the mitigation-related technological needs of developing nations need and the technology transfers actually realized through CDM, whereas we must bear in mind that it had been designed with a view to facilitating technology transfers – an expectation that was also very clearly stated in the Kyoto Protocol. Other problems exist that have been thoroughly analyzed, such as high transaction costs or complicated procedures.

China offers a good illustration of how CDM is missed opportunity of mitigating large-scale effort. In its 11th five-year plan (FYP) for the 2005-2010 period, China imposes itself a set of quantified targets to reduce its energy intensity by 20 % and its pollution intensity by 10 %. These targets are not recognized by the current Carbon trade regime though. One criticism is that setting intensity-based targets does not reduce emissions. Another criticism is that energy saving is something China would have to do anyway. Nevertheless, our projections show that the implementation of such targets over 2 more FYP periods would result in avoiding a cumulated 58.1 GtCO₂e emission, with China's emissions peaking before 2030 or much earlier depending on the stability of the growth rate. If

GDP grows at 10.04 % in the 11th FYP, and at 7.67 % in 12th and 13th FYP periods, emission would peak right after 2020; if GDP grows at 10%, 6% and 5% respectively, emissions would peak much earlier. Intensity-based reduction targets can thus result in large amount of emission reductions.

In order to meet the targets for energy and pollution intensity reduction in the current FYP, China has already closed small power plants for an equivalent of 25.87 gigawatts, reduced the production of cements by 100 million tons, steel by 50 million tons, coke by 30 million tons and paper by 5 million tons. China has also invested 21.3 billion RMB in 2006, 23.5 billion RMB in 2007 and 27 billion RMB in 2008, not counting social costs from subsequent unemployment. In 2007, 1000 enterprises spent 50 billion RMB on technology upgrades to fulfil the energy saving contracts signed with the Chinese government, in addition to the 5.56 billion RMB invested by the government.

Despite these efforts, however, the current carbon trade regime does not acknowledge the targets and the investments and contributions they require. Our projections show that if the intensity-based reduction plans were maintained, China would have produced the largest climate change mitigation programme in the world. Nevertheless, the reality is that China is alone in this enterprise. As a consequence, we are forced to ask the following questions: can China alone afford to continue this ambitious plan for two or three more FYPs? What if China cannot do it? We definitely need a mitigation mechanism that is more inclusive so as to encourage the participation of developing countries and to give more incentives for all the participants to comply with the agreed upon procedures.

This is the reason why we are proposing a new mechanism, the Inter-country joint mitigation plan (ICP), to address the urgencies of large-scaled joint actions, the need to mobilize the participation of developing country, the lack of financial flows and technology transfers. The ICP should be seen as a middle-ground mechanism which can operate on the basis of bilateral or multilateral agreements, even if a global deal is not reached at the Copenhagen Conference. ICP rests on three principles or preconditions under the principle of common but differentiated responsibilities: national voluntary intensity-based energy saving and emission reduction targets from developing countries should be recognized internationally; emission reduction targets, technology transfer and financial flows built into an ICP should incorporate international monitoring, reporting and verification standards; an international fund should be set up to resource the ICP.

Concretely, an ICP is formed ICP formed by a host (non-Annex 1) country and one or more partner (Annex 1) countries. The host country proposes an ICP featuring its national intensity-based reduction targets and needs in technology and finance inviting partner countries for joint implementation. The results of the ICP count toward the emission targets of the participating countries based on the assumed responsibilities. The partner countries have two to three basic responsibilities or rights to an ICP: sharing the targets of emission reduction, transferring the needed technologies required for realizing the target; and/or allocating the funds required for the realization of the target.

The final point is that ICPs are a way to bridge mitigation strategies and economy performances. It acts as an incentive for host countries since it places national interests at the centre of sustainable development strategies. Furthermore, since ICP target specific industrial sectors, they accelerate the shift to low carbon economy sector by sector, through technology progress and infrastructure upgrading in addition to emission reduction. Finally, the implementation of an ICP enhances the capacity for economic cooperation of the host country, which will have positive impacts on its overall economic development in the long run.

With regard to ICPs, the United Nations have a key role to play in supporting and facilitating the negotiations towards an ICP, in evaluating its implementation. The assessment of ICP proposals would focus on targets, joint actions of delivery, responsibilities and commitments, resources required and benchmarks for monitoring and evaluation. ICP is thus also an incentive for financial flow as open policies and market incentives in host countries will attract needed technologies and financial investment. The case of China is very instructive in that regard. If we consider the last thirty years of economic reform and sustained GDP growth, we can observe that, from 1979 to 2007, the use of foreign capital in China reached 138 billion US dollars, of which Foreign Direct Investment (FDI) counts for 100 billion US dollars. Not a single cent of these investments was free: the transactions were entirely based on mutual benefits and technology transfers. 75 R&D centres have been set up by foreign companies and 68 % transnational corporations selected China as their overseas R&ND location. These decisions aimed to maximize their economic profit but China has definitely benefited a lot from these. ICPs provide and expand the range of such opportunities.

As we are gathered at the initiative of UNESCO, I will conclude on the urgent need to reform our education systems. Managing a low carbon economy requires new visions, new knowledge, new capacities and skills that are not really systematically dealt with in our current education system. Yet, it is really difficult to imagine that the power of education can be ignored when it comes to building a green economy.



Sheng Fulai

Sheng Fulai is Senior Economist at UNEP's Economics and Trade Branch

His areas of expertise include integrated policymaking, international payments for ecosystem services, and integrated economic and environmental accounting. Currently, he is leading a UNEP technical team on a global green economy initiative. Sheng holds a Masters degree in economics from the Shanghai University of Finance and Economics. Over the last twenty years, he has served the Chinese Ministry of Finance, the World Bank, the World Wide Fund for Nature, and Conservation International. His major publications include: Real Value for Nature – An Overview of Global Efforts to Achieve True Measures of Economic Progress; Comparative Assessment of Development Options; Macroeconomic Policies, Poverty and the Environment (co-author); Rights, Wants and Needs: Economic Instruments and Biodiversity Conservation; and Integrated Policymaking for Sustainable Development (co-author).

My presentation will consist first in a very brief introduction to the United Nations Environmental Programme (UNEP) -led Green Economy Initiative. Then I will pass to a few specific ideas about education, the sciences and culture, which are the bread and butter of UNESCO. UNEP launched the Green Economy Initiative in October 2008 at the height of the global financial crisis. Later on, the Green Economy Initiative was adopted by the United Nations as a system-wide initiative in response to the financial and economic crisis. Over 20 UN agencies and multilateral institutions have been involved in the implementation of this initiative including UNESCO. The initiative consists in a range of products and services from research to capacity building activities. All aim to enable and encourage - or encourage first and then enable - governments to increase their investments in green sectors supported by policy reforms and institutional reforms. The ultimate goal is for a green economy to contribute to economic recovery, decent jobs creation, poverty reduction and carbon dependency reduction.

As for specific ideas suggestions, I will start with education. The issue of education is not confined to the education and training for green skills or green jobs. It is broader than that. One important dimension is probably education at the citizen level. There should be more reflection on this dimension in the future. Citizens code of conduct could be developed to help them take their responsibilities for reducing carbon emissions. International recognitions could then be awarded to individual citizens for taking extraordinary personal actions and initiatives on climate change. My second suggestion will pertain to the sciences. I am of the opinion that we need to bring climate sciences from up in the air down to the earth. Climate sciences must be brought down to earth and translated into messages that ordinary citizens can apply in their daily lives to reduce their carbon dependency and footprint while preserving their quality of life. If that doesn't exist already, a UNESCO could publish a guide of ideas applicable at the household level, low carbon ideas for example. It may be quite popular internationally. When talking about the sciences, we should not automatically confine the sciences to the natural sciences. We should also think about innovations in the social sciences. We must envisage new ways in which to design, debate and implement public policies. Many other areas within the

social sciences could be mobilized with a view to supporting societal change towards a green society.

My final suggestion will be on culture. It must be reminded that many traditional cultures contain very effective green elements that are waiting to be recognized and promoted internationally. For example, these elements can be found in traditional approaches to architectural design, rainwater storage, or management of common resources. This last example is perfectly illustrated in the work of the 2009 economics Nobel laureate Professor, Elinor Ostrom, whose major finding is that in numerous cases, community self-regulations of common property can be much more effective than government interventions either based on market principles or based on regulation. Such conclusions invite to look into the traditional cultures that contain green elements so as to give them the profile that they deserve.



Kevin WATKINS

Kevin Watkins is Director of
UNESCO's *Education For All Global
Monitoring Report*

It is a great honor to have been invited to reflect on such a theme as the green society. It is very useful to take a step back and ask fundamental questions about our responses to climate change and the role of education in that context. Upon listening to Laurence Tubiana, who is involved in the crucial negotiation process of the Copenhagen Conference, it struck me how different she is from most people traditionally involved in such negotiations. They seem to believe that the stakes boil down to a game of tactical maneuvers and smart moves focusing on who is going to move first, what shall be offered now and what should be expected later in return before moves are made again. There are whole theories and whole books written about this process. The problem with climate change is that we are negotiating with the planet and that the planet does not negotiate. This is my starting point: we need to take the measure of the challenge we are facing.

When we watch the news at night, it usually ends with a couple of figures usually about the movement of currencies, the state of the economy, house pricing and so on. But we are not exposed to indicators on the state of this planet we inhabit. We can nonetheless refer ourselves to the work of the Intergovernmental Panel on Climate Change. They have built six main scenarios combining data on emissions trajectories, levels of emissions anticipated, assumptions about growth and projections of demographic trends. If we build on their assessments and prolong them, we actually realize that the world is running along the worst case scenario. In other words, revisions of the IPCC scenarios, such as these hypothesized by the UK based Hadley centre, show that we are moving in a direction which is much more far worse than anyone anticipated from some of the original scenarios. The most likely scenario is that, by the end of the century, we will be looking at climate change at a range of 5 to 6°C in temperature increase - much higher than the 2°C deemed sustainable by the experts. These data help us understand where our planet is moving and what kind of environment the negotiations are about. We are moving in a dangerous direction.

This picture sometimes leads the media to present us with apocalyptic scenarios. Most of us are familiar with the headlines announcing how many millions of people, the so-called “climate refugees” will be displaced by floods, or how many millions will be facing increased hunger- or health-related risks. While

those scenarios may be realistic, I am convinced that they are actually diverting our attention from much more important problems. Those scenarios are indeed playing out in a world where almost two billion people are surviving on less than two dollars per day, a world where ten million children are dying of nutrition-related problems every year. When you have such a sizable part of the human community living so close to the edge, there is no need for an apocalypse to push you over. Part of our role as educationists is to communicate to policy-makers and the public that, today, those scenarios are associated with very small incremental risks in the lives of poor people and that, consequently, they are going to hold us back in the fight against poverty. This has implications for education as well because when droughts spread and poverty is on the rise, we know that people are more unlikely to put their children into school and that they are exposed to additional health risks. These are the threats we are all facing today.

As education specialists, we have to be far better and smarter how we communicate those risks. It is my conviction that, regarding those challenges, education has major functions as well as minor ones both of which we in UNESCO can address. The major functions pertain to communicating issues which are still not widely understood beyond the scientific community. The first issue is that climate change is an irreversible problem. You cannot take carbon out of the atmosphere. Once it is up there, it is up there to stay. Today are already living with the consequences of emissions produced during the industrial revolution. As a result, the mistakes we make today will lock future generations into the consequences. The problem is cumulative, which is related to the first point: there is no stopping the clock. To repeat myself, the emissions we are pumping into the atmosphere over the next two to three years will add to the emissions already accumulated and generate the consequences that we are growingly aware of. All this creates a situation of emergency that is all the more aggravated as we delay action.

Delay in some negotiations do not matter that much. Take the Doha round launched by the World Trade Organization (WTO). Those negotiation have been going on for almost a decade without achieving anything useful: the world is not coming to an end as a result of such delay. Climate change negotiations are very different: a delay will have very tangible consequences.

This is where some of the minor functions of education can have a positive impact. Education can convey the scope of the issues and disseminate

guidelines for action. In his intervention, Fulai Sheng rightly pointed to the role UNESCO may play in communicating to people and raise their awareness on the need and the means to measure their own carbon footprint at the household level, or help them make personal decisions on energy use so that they can have a positive impact on the lives of poor people. We can also communicate the actions poor people can undertake to make a difference. Curriculum in schools can, in other words, have a pivotal role. We need to educate the next generation about climate change: they must not repeat the mistakes of our generation and previous generations. Unfortunately, such education has not been done very effectively so far.

Crucial ethical issues are at stake: the questions we are facing actually go to the heart of what it means to be a member of the human community. Ethics is assuredly about taking responsibility for the consequences of one's action on other people. Ethics is about decisions we all take, decisions we take at UNESCO when we fly to conferences around the planet or decisions we take at home, all of which have consequences for some of the poorest people of the world. Those decisions also have consequences for future generations. Two sets of actors thus lack a strong voice in international negotiations, the poor of the world and our children as well as their children, our grandchildren. In the future, we must reflect more consistently on our ethical responsibilities and obligations to people. Historically, this is not an area where we the human community has excelled. Nonetheless, it is imperative that we bring this ethical concern right to the center of the climate change agenda.

The ethical dimension of climate change sends us back to the Brundtland Report and its central principle: long-term development is impossible if the ecological sustainability of the human community is compromised. A beautiful Amerindian proverb says that "we do not inherit the earth from our ancestors; we borrow it from our children". All decision-makers need to understand the deeper meaning of that truth. It is a principle which underpins many of the great religions of the world, whether it is Islam, Buddhism, Christianity or Judaism - but it does not inform negotiating processes.

When reflecting upon the links between, on the one hand, the very specific negotiations of the Copenhagen Conference and, on the other hand, these great ethical issues and these global threats we face as a community, we must not allow the scale of the problem to disempower us. Disempowerment is not an

attitude we can afford. We need practical actions. From my perspective, the 2050 target set by political leaders is largely irrelevant. Let us acknowledge it in honesty: which government is going to commit to a target for 2050 that they really care about? By then, most of the present day political leaders will not be alive, let alone in power. What really matter are the stepping stone targets that we obtain out of the Copenhagen Conference. What we really need is a road map that takes us away from our current course and puts us on a sustainable path.

In order to implement such a road map, technology transfers to the poorest countries are indispensable – as was stressed by professor Li. More generally, we need to sever the link between economic growth and carbon emissions as the bulk of the incremental emissions increasingly originate in the poorest countries. Most of these lack the financial and technological resources required to de-carbonize growth. Technological transfers and financial assistance will thus offer more development options to this group of countries. Finally, as carbon trading is expected to expand significantly, generating immense financial flows from rich countries to poor countries, it is critical that Africa is not bypassed by these mechanisms. Nor must Africa be bypassed when it comes to supporting adaptation. Presently, the international community roughly spends what the city of London spends every two weeks on flood defences for climate change adaptation in poor countries. This is not an acceptable response. We know that part of this problem is now set in stone and that it has become unavoidable: Africa suffer from the consequences of climate change, which calls for an effective response by the international community.



John CROWLEY

John Crowley is Chief of the Ethics of Science and Technology Section of UNESCO and Chief Editor of the *International Social Science Journal*

My contribution will attempt to complement the analyses of the previous presentations. My question for this purpose will be: what would a green society look like if we had one? We can easily agree that “green” in the current debate tends to serve as a placeholder which is used pending clarification of what could or should be done when, how, by whom, for whom, and why? That statement is not even a criticism; it is simply a reminder of the scale of the challenge we face, which is not simply to implement “greenness” but to think it, make sense of it, and then find out how to work with it. The reasons why it may be difficult for agents whether individuals, businesses, States or others, to assess whether they are acting greenly are fairly straight forward. A number of the previous interventions have referred to them. I would like to emphasize two of them for the present discussion: first, the uncertainties as to the metaphorical thrust and focus of greenness and, secondly, the cognitive and ethical uncertainty as to the implications of responsibility.

With regard to the uncertainty of metaphor of greenness, it is important to keep in mind that self-conscious green movements are notoriously split between those who believe that the environment broadly understood represents a set of constraints on human activity and achievements and those who, on the contrary, believe that nature rejects an anthropocentric approach to value. As a reminder that this difference has sharp teeth, consider the question whether the planet can sustainably support several billion humans. Many leading figures in the so-called deep green school of thought regard the carrying capacity of the Earth as being significantly below one billion people. This position has teeth and raises complications. It is not simply a trivial academic debate if it were to be taken seriously. Thus, when we say green we do not really know what green means. It may be convenient to skirt around the disagreements to keep the ball of debate rolling; but at some point we will have to engage with some of these fundamental disagreements.

Secondly, regarding cognitive and ethical uncertainty as to the implications of responsibility, moral philosophers have been telling us for many centuries that “ought” implies “can”. It is pointless to tell someone they must do something that they are incapable of doing. But “can”, the ability to act, implies cognitive mastery of causal chains that are sufficiently complex to undermine any simple

straightforward and perhaps even any precise assignment of responsibility. It is well known that what might be called first order thinking, in other words thinking that stops at the immediate consequences of action, has tended to play a major role in our responses to climate change as to many other challenges. Biofuels, in particular, and, to a lesser extent, windmill turbines looked green until all their indirect effects had been taken into account. More generally there is no guaranty that any assemblage of individually green actions will produce a green society. Conversely it is not clear whether any centralized or synoptic planning process can bear the required burden of judgement nor is it clear that market-based incentives that involve steering the economy and society rather than planning them are necessarily more flexible or less irreversible than more centralized and more old-fashioned modes of planning. Trying hard to be green could, in other words, prevent us from achieving greenness. This behavioural and policy dilemma is a very familiar one. It goes under the name of the law of unintended consequences. It is one that must be kept in mind.

Humanity has been through this before if one thinks of the sequence that led, during the century of enlightenment, from the “Fable of the bees” to the invention of classical and post classical Marxism, which were attempts to answer the fundamental questions “What is value?” and “how can we conduct collective action once the theological basis for both value and collective action had been stripped away?” We face something of the same challenge and obviously the solutions that we have developed between 1705 and 1850 to answer it are no longer available to us. They are indeed the backdrop against which the contemporary challenges have emerged. In principle, there are a number of ways in which this two-fold tension inherent in the notion of greenness could be resolved. But most of them involve picking one side and sticking to it, which, I would like to suggest, might not be the most appropriate way of operating. We might say for instance that a green society is one that should be based on sustainable growth and that governments should be primarily responsible for creating the conditions for sustainable growth; but this does not solve the problem. It simply evades it.

My conclusion is consonant with a number of things that have been said by previous contributors: there is no adequate solution to the problem that does not recognize first the pluralism and second the uncertainty that lie at the heart of contemporary environmental challenges, including but not limited to climate change. By pluralism, in this context, I mean, as one does in moral philosophy, the absence, even in principle, of any overarching value framework that could

decide once and for all and for everyone what should count as green. By uncertainty I mean the absence, even in principle, of any overarching cognitive framework that could decide once and for all and for everyone who should do what to ensure collective greenness. To this extent, I can only agree strongly with what Laurence Tubiana affirmed earlier: what is at stake is what one could call, in her terms, a new social contract or a new approach to social contracting, in other words a new set of procedures to deal with pluralism and uncertainty in the pursuit of the inherent ever unfinished task of sustainability.

In this respect ethics and politics necessarily go hand in hand. The director-general referred in his opening statement to the resolution adopted by the general conference of UNESCO in October 2009 regarding a study on the advisability of a declaration of ethical principles in relation to climate change. UNESCO proposes to make ethics and politics march hand in hand. This kind of connection between the ethical and the political is indeed the whole point of sustainability in its canonical form the form first stated in the Brundtland Report. In this form sustainability means preserving the capacity of future generations to meet their needs in the absence of any certain knowledge about the values those very future generations might subscribe to about the technical and cognitive capacities or the constraints they might face. I think that this concern, or this sensitivity and perhaps this confidence, which are required with respect to future generations also applies recursively to our selves – starting now.

Moving Towards a Green Economy and Green Jobs



Hans D'ORVILLE

Hans d'Orville is Assistant Director-General of UNESCO for Strategic Planning

Preparing for a green future – the role of education and the knowledge society

The multiple crises of 2008 – climate change, financial and economic crisis, food crisis, oil crisis, natural resource scarcity, poverty – require a fundamental and holistic re-think of how a globalised world operates. Climate change in particular, caused by greenhouse gas emissions, is a defining challenge of our time and poses a clear danger to global prosperity and security. Green and growth can go hand in hand. Policymakers and other stakeholders must be motivated to give green investments sufficient space in counter-cyclical policies.¹

The UN Secretary-General has called for a new green deal that invests in clean and renewable energy resources. “By investing in green, we create jobs and spur economic growth. At Copenhagen, we need to unleash green investment and jump-start a lasting economic recovery.”

The United Nations Environment Programme (UNEP) published a Global Green New Deal Policy Brief outlining how the creation of green jobs could help leapfrog sustainable economic development, while at the same time combating environmental pressures and climate change. This was followed by the Green Economy Initiative (GEI) of 26 June 2009 by 21 UN system organizations, entitled “Green Economy: A Transformation to Address Multiple Crisis”. It seeks to promote “investment in long-term environmental sustainability and putting the world on a climate-friendly path” and to tackle development challenges by “motivating policymakers to give green investments sufficient space in counter-

1 This chapter is a revised version of the presentation made by Hans d’Orville at the session of the UNESCO Future Forum held in Guiyang, China, in August 2009, on the theme: “Moving towards a green economy and green jobs”.

cyclical policies”. I am particularly pleased that, Fulai Sheng, of UNEP, who has coordinated the preparation of GEI is among us today.

Efforts towards a green economy require a set of sound short-, medium- and long-term policies and approaches that will define a new development paradigm with the involvement of all stakeholders. One of the key planks is education for sustainable development (ESD) to encourage changes in individual behaviour, attitudes, lifestyles, consumption and production patterns and the teaching of skills and competencies and research capacities, thereby contributing to a more sustainable future based on environmental integrity, economic viability and gender equality for present and future generations. The present crisis is also an ethical crisis. It compels us to re-examine and reflect on the aspirations and habits that govern our global society. A green economy initiative must therefore also be rooted in and aligned with ethical considerations and precepts. The responsibility of scientists to contribute to the good of humankind is a corollary of the human right to enjoy the benefits of scientific progress; to that end codes of conduct for an ethical approach to the use of science and technology and other scientific activities that respect human dignity and human rights may need to be developed and implemented.

ESD concepts must be fully integrated into all learning and teaching processes in all types, levels and settings of education, ranging from early childhood care and education (ECCE) to higher education, as well as in the non-formal system and through life-long learning and in teacher training. Curricula and learning materials will need to be revised through the integration of global policy frameworks and guidelines covering education on global sustainability challenges (education for climate change, education for responsible consumption and lifestyles, with particular emphasis on the sustainable use of water resources). In the process, ESD seeks to impart trans-disciplinary understandings of social behaviours, cultural attitudes, economic and environmental dimensions of sustainability and ethical values.

A particular key educational element will be technical and vocational education and training (TVET). In general, the success of universal primary education in developing countries over the last decade is translating now into pressure for expansion of both general and technical and vocational secondary education. This presents a huge opportunity, as effective national policies will allow to build skills which are not only critical for labour markets and economic growth but which can also be designed in line with sustainable development and green

economy needs and exigencies. Literacy and youth and adult education programmes should also be linked to micro-finance, income-generation and life skills, fostering values, attitudes and skills that support sustainable development;

ESD is contingent upon a vision of the world where everyone has the opportunity to benefit from quality education and to gain the knowledge and skills required for sustainable development and positive societal transformation. ESD must focus in a holistic manner on the interdependence of the environment, economy, society, and cultural diversity from local to global levels. Without nurturing a common culture of sustainable development and sustainable consumption patterns, a green economy will remain an empty vessel. As the Director General of UNESCO, Koichiro Matsuura, stated “ESD is, indeed, education for the future.”

Creating skills and capacities for the provision of advice and assistance concerning the development and implementation of science, technology and innovation policies has the potential to help spur growth while ensuring environmental sustainability and a climate-friendly path. To this end, we must invest much more in climate knowledge, education, science and technology.

A prime task is to foster better scientific knowledge about complex ecosystems, biodiversity and the links between biological diversity, cultural diversity and the social aspects of sustainability as well as support the development of efforts to assess, monitor and provide early warning on ecosystems and on key climate trends. We need to strengthen the capacity of countries – especially developing countries – to drive the research for even better solutions and better understanding of climate change and to invest in knowledge capable of bolstering sustainable development.

It is only through innovation, education and knowledge that new – and green - jobs can be created and new technologies developed that will be critical to solving real-life problems relevant for the emergence of a green economy. Scientific and intellectual leadership is the key to creating the new green economy of the 21st century – a once-in-a-generation chance, as UN Secretary-General Ban Ki-moon emphasized on 18 August 2009 in Seoul. Overall, strengthening the knowledge base about Earth system processes and natural resources, both renewable and non-renewable, will also be critical. Policies for the management and protection of oceans and coastal areas must also be reviewed so as to build capacities to prevent the degradation of the marine environment and maintaining biodiversity and the sustainable use of marine and coastal habitats.

The transformation to a green economy and to green collar jobs must thus be embedded in a knowledge-based society and be buttressed by massive investments in education and research in the sciences. An important facet of this effort is the change in values, knowledge, skills and competencies of future generations.

In ESD, Member States are encouraged to reorient their education system, promote greater interdisciplinarity and recognize the social, environmental, economic and cultural dimensions of development and how they interrelate. ESD also means empowering learners to think critically and creatively, to solve problems and to take decisions that consider the long-term future and its sustainability. Above all, ESD is about promoting values that will enable learners to become real agents of change – values such as peace, equality and respect for others and the wider social and natural environment.

Four areas are of particular relevance: (i) to promote basic education and literacy, without which access to environmental knowledge is severely hampered. (ii) the reorientation and revision of education programmes from nursery to university – including teacher education; (iii) addressing the general public through media, networks and any means of informal education is a fundamental aspect to develop public understanding and awareness in all the sectors of society and to spread the practice of ESD at the grass-roots level, especially through multimedia communication strategies; and (iv) to provide practical training, particularly in the world of work. Green collar jobs will require training programmes in vocational schools and universities.

The transition towards a green economy offers furthermore a unique opportunity for the advance of a developmental model that is respectful of cultural diversity. Culture is pivotal in promoting eco-diversity, This entails acknowledging and promoting different approaches in shaping sustainable environmental practices and disaster reduction measures, respecting indigenous knowledge systems as they can offer innovations and practices based on traditional lifestyles that are relevant for the conservation and sustainable approaches to biological diversity. Culture therefore represents a soft power and a catalyst for environmental awareness.

Achieving sustainable development requires balancing environmental, societal, cultural and economic considerations in the pursuit of an enhanced quality of life. The integration of the cultural community, including artists, musicians, crafts

people, designers, architects, film-makers, photographers, the media and many other creative actors into environmental initiatives and studies is often neglected, but strategically exceedingly significant.

The success of any policy aimed at protecting the environment and abating the impact of climate change depends on public understanding, awareness and engagement. Publicity and education as well as involvement of citizens and civil society in environmental protection measures, clean manufacturing and sustainable technology will allow all stakeholders and in particular the general public to be exposed to – and accept - new concepts and recognize their long-term benefits.

As our goal is to build the ecological civilization, we should remain aware that one of the essential features of a civilization is its ability to dialogue – peacefully – with other civilizations. This extends to the concept of a green economy and green society, by which productive forces are mobilized that protect the environment and change production and consumption patterns towards a sustainable future. We should strive to learn from others and from leading nations as well as from leaders in particular fields. Our common objective must be to stimulate innovative developments according to our own means and situations, working together and with others to reap collective benefits for humanity and the world economy.

Annex

Documents transmitted to UNESCO on the occasion of the UNESCO Future Forums on the Green Economy and Society



Michel Jarraud

Michel Jarraud, is the Secretary-General of the World Meteorological Organization

Before joining the WMO Secretariat as Deputy Secretary-General in January 1995, Michel Jarraud, a French national, devoted part of his career to the European Centre for Medium-Range Weather Forecasts (ECMWF) and the French National Meteorological Service, Météo-France.

The World Meteorological Organization expresses its appreciation to UNESCO for organizing this Forum.

The UN Secretary-General has affirmed that the climate change challenge and what we do about it will define us, our era and, ultimately, our global legacy. This is an area where WMO made substantial contributions since 1976, when it issued the first authoritative statement on atmospheric CO₂ and its potential impacts upon the Earth's climate.

In 1979 WMO organized the First World Climate Conference, as a result of which in 1988 WMO and UNEP co-established the Intergovernmental Panel on Climate Change (IPCC), which at the end of 2007 approved its Fourth Assessment Report (AR4) and received the prestigious Nobel Peace Prize. The 1990 Second World Climate Conference set the ground for the establishment of the UNFCCC, which will hold its 15th Conference of Parties in Copenhagen next December. Thanks to these efforts it is now scientifically established that global warming is unequivocal - as is evident from increases in average air and ocean temperatures, widespread melting of snow and ice and rising average sea level - and linked to the observed increase in anthropogenic greenhouse gas concentrations.

All UN system supports and participates in the UN System-wide effort to “Seal the Deal” in Copenhagen on an effective and equitable climate change agreement beyond 2012. The developing world faces today vital and immediate social needs, so given the number of looming crises (finance-, food- and health-related), it might be tempting to relegate climate change adaptation and mitigation issues to some future date when better - and cheaper - technologies will become available.

But even if we managed to reduce our emissions to zero today, the inertia in the climate system would result in further warming for many years, so the global community would have to address immediately at least the need for adaptation measures, particularly in the developing world, which is most vulnerable. However, remaining scientific uncertainties and lack of historic precedents do not allow us to extrapolate, with any reasonable degree of assurance, that in passing the burden to the next generations we would not also be leaving them an open door to a potentially catastrophic and perhaps irreversible situation, so from this perspective it is indeed imperative to reach a full arrangement in urgency, in terms of both adaptation and mitigation.

Today there is increasing awareness on the key socioeconomic value of weather, climate and water information and services. To support policy formulation and decision-making involving climate change impacts on socially-sensitive sectors,

as well as to strengthen capacity building, WMO recently convened in Geneva with partners the Third World Climate Conference (WCC-3), from 31 August to 4 September 2009, under the theme “Climate Prediction and Information for Decision-making”. The WCC-3 was organized as a collective effort under the UN Climate Knowledge cluster convened by WMO jointly with UNESCO.

The WCC-3 adopted by acclamation a High-level Declaration calling for the establishment of a Global Framework for Climate Services (GFCS), to strengthen science-based climate predictions and services in support of decision-making in most of social and economic sectors. As the global community moves forward with adaptation and mitigation strategies, the high quality user specific climate products will play a key role for shaping and sustaining the green future.

WMO has a long history of successful collaboration with UNESCO and its Intergovernmental Oceanographic Commission (IOC), including the co-establishment of the Global Climate Observation System (GCOS) and the World Climate Research Programme (WCRP) in response to action called by the Second World Climate Conference, and the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM). WMO and UNESCO will continue to join efforts in the context of the UN system, to “deliver as one” on climate knowledge.



Saskia Sassen

Professor of Sociology at Columbia University and Centennial Visiting Professor at the London School of Economics

Saskia Sassen is the Robert S. Lynd Professor of Sociology and Member, The Committee on Global Thought, Columbia University (www.saskiasassen.com). Among her recent books are *Territory, Authority, Rights: From Medieval to Global Assemblages* (Princeton University Press 2008) and *A Sociology of Globalization* (W.W.Norton 2007).

The *Global City* came out in a new fully updated edition in 2001. Her books are translated into twenty-one languages. She has received several awards, most recently doctor honoris causa from Delft University (Netherlands), from DePaul University (USA) and from Université de Poitiers (France). She is the Chair of the new Urbanism competition at the Venice Biennale of Architecture (2010). She contributes regularly to www.OpenDemocracy.net and www.HuffingtonPost.com.

Bridging the ecologies of cities and of nature

Abstract

Cities are a type of socio-ecological system that has an expanding range of articulations with nature's ecologies. Today, most of these articulations produce environmental damage. The chapter examines how we can begin to use these articulations to produce positive outcomes – outcomes that allow cities to contribute to environmental sustainability. The complex systemic and multi-scalar capacities of cities are a massive potential for a broad range of positive articulations with nature's ecologies.

Introduction

The massive processes of urbanization under way today are inevitably at the centre of the environmental future. It is through cities and vast urban agglomerations that humankind is increasingly present in the planet and through which it mediates its relation to the various stocks and flows of environmental capital. The urban hinterland, once a mostly confined geographic zone, is today a global hinterland. With the expansion of the global economy we have raised our capacity to annex growing portions of the world to support a limited number of industries and places. Here I address the multi-scalar character of cities: the diverse terrains and domains, many non-urban, onto which they project their effects and from which they meet their needs. And I address their ecological character: the multiple mechanisms and feedback loops that articulate urban processes and their consequences, and, furthermore, the emergent articulations between these urban ecologies and nature's ecologies. The multi-scalar and ecological features of key city processes need to become part of urban governance so that the process of governing cities becomes also part of the process for developing a more environmentally sustainable society.

The need to distinguish format from content

The enormously distinctive presence that is urbanization is directly and indirectly contributing to change a growing range of nature's ecologies, from the climate to species diversity and ocean purity. And it is leading to the formation of new environmental conditions -- heat islands, ozone holes, desertification, and water pollution. Urbanization and industrialization have made humankind the major consumer of all significant ecosystems. There is now a set of global ecological conditions never seen before. Major cities have become distinct socio-ecological systems with planetary reach, going well beyond urban space. The needs of cities, and the profit logics of agribusiness, have altered traditional rural economies and their long-standing cultural adaptation to biological diversity. Rural populations have become consumers of goods, including food, produced in the industrial economy, one much less sensitive to biological diversity. The rural condition has evolved into a new system of social relations, one that does not work with biodiversity. These developments all signal that the urban condition is a major factor in any environmental future. It all amounts to a radical transformation in the relation between humankind and the rest of the planet.

But is it urbanization per se or the particular types of urban systems and industrial processes we have instituted? That is to say, is it the urban format marked by agglomeration and density dynamics, or the contents we have historically and collectively produced partly through a processes of path-dependence which kept eliminating options as we proceeded, and partly because of the profit logics of firms. Are these global ecological conditions the result of urban agglomeration and density or are they the result of the specific types of urban systems we have developed to handle transport, waste disposal, building, heating and cooling, food provision, and the industrial process through which we extract, grow, make, package, distribute, and dispose of all the foods, services and materials we use?

It is, doubtless, the latter – the specific urban systems we have made. One of the outstanding features when one examines a range of major cities today is their sharp differences in environmental sustainability. These differences result from diverse government policies, economic bases, cultures of daily life, and so on. Here follow two examples from the US which show that in a country that is deeply anti-regulation and anti-government, good urban leadership can make an enormous difference.

The first case concerns a city in Texas and shows that against all odds, a determination to green a city can be developed and implemented. In 2000 Austin began to implement a Green Buildings Program that has now been recognized internationally as a model program. It is transforming the local building market by providing education, marketing and monetary incentives to develop both the demand side (the buying public) as well as the supply side (building professionals). The program is primarily funded and managed by the city's community-owned utility, Austin Energy. This community utility also develops renewable energy sources for the city — including 59 local wind-turbines, four landfill methane gas recovery projects and three solar energy sites providing over 153 kilowatts of energy. This case is quite remarkable for the US, a country that is deeply anti-government. What makes it even more extraordinary is that Austin is the only city run by a Democratic Party mayor in Texas, one of the most Republican, free-market, antigovernment, anti-regulation states in the US. Having a community-owned energy organization is extraordinary for the US, and even more so under these conditions. It shows how a well-designed effort and determination can succeed even in the most inhospitable situation.

The second case concerns Chicago, with an economic history of vast heavy manufacturing, steel mills, agribusiness, the most important heavy transport centre in the country. Today, and again, against all odds, Chicago is determined to establish itself as a premier environmental city, with the goal to get 20 percent of its energy from renewable sources within the next five years. This includes solar, wind, biomass, small hydropower, and tapping landfill gas. Chicago has planted thousands of trees over the last five years, created more than 100 miles of bike paths in the city, installed solar panels on city museums, and built a rooftop garden on City Hall. Chicago has passed legislation to reduce urban “heat island” effect by allowing only reflective roofs or living roofs covered with vegetation. Across the differences of cities are a few foundational elements that dominate our way of doing things and which are at the heart of what we need to address. One of these is the fact that the entire energy and material flux through the human economy returns in altered form as pollution and waste to the ecosphere. The rupture at the heart of this set of flows is made and can, thus, be unmade – as the two examples from one of the most socially regressive countries in the world show. This rupture is present in just about all economic sectors, from urban to rural. But it is in cities where it takes on its most complex interactions and cumulative effects. This makes cities a source of most of the

environmental damage, and some of the most intractable conditions feeding the damage. And yet, it is also the complexity of cities that is part of the solution.²

The complexity and global projection of cities

The complexity and diversity of cities can help us engage the legal systems and profit logics that underlie and enable many of the environmentally damaging aspects of our societies. The question of urban sustainability cannot be reduced to modest interventions that leave these major systems untouched; further, the actual features of these systems vary across countries, and across cities within countries. While in some environmental domains (e.g. protecting the habitat of an endangered species) we can make considerable advances by acting simply on scientific knowledge, this is not the case when dealing with cities, or with society at large. Non-scientific elements are a crucial part of the picture: questions of power, poverty and inequality, ideology and cultural preferences, are all part of the question and the answer. Policy and proactive engagement are critical dimensions for environmental sustainability, whether they involve asking people to recycle garbage or demanding accountability from major global corporations known to have environmentally damaging production processes.

The spaces where damage is produced often differ from the sites where responsibility for the damage lies (such as the headquarters of mining corporations) and where accountability should be demanded. A crucial issue is the massive investment around the world promoting large projects that damage the environment. Deforestation, mining, and construction of large dams are perhaps among the best known cases. The scale and the increasingly global and private character of these investments suggest that citizens, governments, NGOs, all lack the power to alter these investment patterns. But particular kinds of cities, global cities, should actually be seen as structural platforms for acting and contesting these powerful corporate actors (Sassen 2005). A firm may have hundreds of mines across the world, but its headquarters might be in one or a few major cities.

2 That it is not urbanization per se that is damaging but the mode of urbanization also is signalled by the adoption of environmentally harmful production processes in rural economies. Until fifty years ago these had mostly environmentally sustainable economic practices, such as crop rotation, and did not use chemicals to fertilize and control insects. Further, our extreme capitalism has made the rural poor, especially in the Global South, so poor that for the first time many now are also engaging in environmentally destructive practices, notably practices leading to desertification.

The geography of economic globalization is strategic rather than all-encompassing and this is especially so when it comes to the managing, coordinating, servicing and financing of global economic operations. According to two major studies (MasterCard 2008; ATKearny 2008), about 75 cities worldwide contain just about all the headquarters of globally operating firms. The fact that it is strategic is significant for regulating and governing the global economy. There are sites – the network of global cities – in this strategic geography where the density of economic transactions and top-level management functions come together and constitute a concentrated geography of global decision-making.

We can see this also as a strategic geography for demanding accountability from major corporate headquarters about environmental damage. It is precisely because the global economic system is characterized by enormous concentration of power in a limited number of large multinational corporations and global financial markets that makes for concentrated (rather than widely dispersed) sites for accountability and for changing investment criteria. Engaging the headquarters is actually easier than engaging the thousands of mines and factories in often remote and militarized sites, and the millions of service outlets of such global firms. Direct engagement with the headquarters of global firms is today facilitated by the recognition, among consumers, politicians and the media, of an environmental crisis. The focus on individual cities promoted by notions of intercity competition in a global corporate economy, has kept analysis and political leaders from understanding the extent to which the global economy needs networks of cities, not just one perfect global city. Thus specific networks of cities are natural platforms for cross-border city-alliances that can confront the demands of global firms. For sure, dealing with the headquarters of large firms leaves out millions of independent small local firms responsible for much environmental damage, but these are more likely to be controllable through national regulations and local activisms.

Scaling

These diverse issues can be conceived analytically as questions of scale. City-related ecological conditions operate at a diversity of geographic scales. Importantly, cities incorporate a range of scales at which a given ecological condition functions, and in that sense cities make legible the fact itself of scaling. For instance, the one asphalted street in a village and its few buildings with air conditioners produce some heat emissions; the thousands of such streets and

buildings in a city produce new socio-ecological condition – heat islands. This, in turn, signals that cities make the multi-scalar aspect of ecological systems recognizable to residents. This urban capacity to make legible should be developed and strengthened as it will become increasingly critical for policy matters concerning cities, as well as regions and beyond.

Scaling is one way of handling what are now often seen as either/or conditions: local vs. global, markets vs. non-market mechanisms, green vs. brown environmentalism. I have found some of the analytic work on scaling being done among ecologists very illuminating in the effort to conceptualize the city in this context. Of particular relevance is the notion that complex systems are multi-scalar systems as opposed to multilevel systems, and that the complexity resides precisely in the relations across scales. “When broad overarching events appear to be closely related to details, a system requires treatment as a complex system.” These authors find that tension among scales is a feature of complex ecological systems, a condition that would certainly seem to hold for cities. Understanding how tensions among scales might be operating in the context of the city strengthens the analysis of environmental damages associated with urbanization as well as ways in which cities are the source for solutions.

A crucial analytic operation involved here is giving spatio-temporal scaling to the object of study. This also entails distinguishing that object of study from contextual variables, which in the case of cities might be population, economic base, etc. Executing such analytic operations would help us avoid the fallacy of holding “the city” guilty of environmental damage. Eliminating cities would not necessarily solve the environmental crisis. We need to understand the functioning and the possibilities for changing specific systems of power, economic systems, transportation systems, and so on, which entail modes of resource use that are environmentally unsound. The fact that these various systems amalgamate in urban formations is an analytically distinct condition from the systems involved. The distinction between specific systems and background or contextual variables also helps us avoid the fallacy of seeing “the city” as a container, and a bounded closed unit. In my research on cities and globalization, I instead conceptualize the city as a multi-scalar system through which multiple highly specialized cross-border economic circuits circulate. This idea can be applied to cities and the environmental dynamic. In this case, the city is a multi-scalar system through which multiple specific socio-ecological circuits traverse. It is not a closed system. Cities are amalgamations of multiple “damage” circuits, “restoration” circuits and policy circuits.

There are a set of specific issues raised by research on ecological systems that point to possibly fruitful analytic strategies to understand cities and urbanization processes both in terms of environmental conditions and in terms of policy. One of the reasons this may be helpful is that we are still struggling to understand and situate various types of environmental dynamics in the context of cities and how to engage policy. When it comes to remedial policy and clean-up there is greater clarity in understanding what needs to be done. But understanding the city as a broader system poses enormous difficulties precisely because of the multiple scales that are constitutive of the city, both as a system of distributed capabilities and as a political-economic and juridical-administrative system. That is to say, the individual household or firm or government office can recycle waste but cannot address effectively the broader issue of excess consumption of scarce resources; the international agreement can call for global level measures to reduce greenhouse emissions but depends on individual countries and individual cities and individual households and firms to implement many of the necessary steps; and the national government can mandate environmental standards but it depends on systems of economic power and systems of wealth production.³

A key analytic step is to decide which of the many scaled ecological, social, economic, policy processes are needed to explain a specific environmental condition (whether negative or positive) and design a specific action or response. Another analytic step is to factor in the temporal scales or frames of various urban conditions and dynamics: cycles of the built environment, of the economy, the life of infrastructures and of certain types of investment instruments. The combination of these two steps helps us deconstruct a given situation and to locate its constitutive conditions in a broader grid of spatial, temporal, and administrative scales.

The connection between spatial and temporal scales evident in ecological processes may prove analytically useful to approach some of these questions in the case of cities. What may be found to be negative at a small spatial scale, or a short-time frame, may emerge as positive at a larger scale or longer time frame. For a given set of disturbances, different spatio-temporal scales may elicit

3 Some kinds of international agreements are crucial –for instance, when they set enforceable limits on each national society’s consumption of scarce resources and their use of the rest of the world as a global sink for their wastes. Other such agreements I find problematic, notably the market for carbon trades which has negative incentives: firms need not change their practices insofar as they can pay others to take on their pollution. At the limit, there is no absolute reduction in pollution.

different responses from ecosystems. Using an illustration from ecology, we can say that individual forest plots might come and go but the forest cover of a region overall can remain relatively constant. This raises a question as to whether a city needs a larger system in place that can neutralize the impact on the overall city system of major disturbances inside the city. One outcome of the research by ecologists in this domain is that movement across scales brings about change which is the dominant process: it is not only a question of bigger or smaller, but rather that the phenomenon itself changes. Unstable systems come to be seen as stable; bottom-up control turns into top-down control; competition becomes less important. This also is suggestive for thinking about cities as the solution to many types of environmental damage: what are the scales at which we can understand the city as contributing solutions to the environmental crisis.

An important issue raised by scaling in ecological research is the frequent confusion between levels and scales: what is sometimes presented as a change of scales is actually a translation between levels. A change of scale results in new interactions and relationships, often a different organization. Level, on the other hand, is a relative position in a hierarchically organized system. Thus a change in levels entails a change in a quantity or size rather than the forming of a different entity. A level of organization is not a scale, even if it can have scale or be at a scale. Scale and level are two different dimensions.

Relating some of these analytic distinctions to the case of cities suggests that one way of thinking of the city as multi-scalar is to note that some of its features, notably density, alter the nature of an event. The individual occurrence (e.g. a high-rise building) is distinct from the aggregate outcome (density). It is not merely a sum of the individual occurrences, i.e. a greater quantity of occurrences. It is a different event. The city contains both, and in that regard can be described as instantiating a broad range of environmental damage that may involve very different scales and origins yet get constituted in urban terms: CO₂ emissions produced by the micro-scale of vehicles and coal burning by individual households becomes massive air pollution covering the whole city with effects that go beyond CO₂ emission per se. Air and water borne microbes materialize as diseases at the scale of the household and the individual body and become epidemics thriving on the multiplier effects of urban density and capable of destabilizing operations of firms whose machines have no intrinsic susceptibility to the disease.

A second way in which the city is multi-scalar is in the geography of the environmental damages it produces. Some of it is atmospheric, some of it internal to the built environment of the city, as might be the case with much sewage or disease, and some of it in distant locations around the globe, as with deforestation. The case of ozone holes is one of the most serious instances of scale-up: the damage is produced at the micro-level of cars, households, factories, buildings, but its full impact becomes visible/measurable over the poles, where there are no cars and buildings.

A third way in which the city can be seen as multi-scalar is that its demand for resources can entail a geography of extraction and processing that spans the globe, though it does so in the form of a collection of confined individual sites, albeit sites distributed worldwide. This worldwide geography of extraction instantiates in particular and specific forms (e.g. furniture, jewellery, machinery, fuel) inside the city. The city is one moment – the strategic moment—in this global geography of extraction, and it is different from that geography itself. And a fourth way in which the city is multi-scalar is that it instantiates a variety of policy levels. It is one of the key sites where a very broad range of policies – supranational, national, regional and local – materialize in specific procedures, regulations, penalties, forms of compliance and types of violations. These specific outcomes are different from the actual policies as they get designed and implemented at other levels of government.

Important also is the need to factor in the possibility of conflicts in and between spatial scales. Environmentalists can operate at broad spatial and temporal scales, observing the effects of local activities on macro-level conditions such as global warming, acid rain formation and global despoliation of the resource base. Environmentalists with a managerial approach often have to operate at very short time frames and confined levels of operation, pursuing clean ups and remedial measures for a particular locality, remedial measures that may do little to affect the broader condition involved and may, indeed, diminish the sense of urgency about larger issues of resource consumption and thereby delay much needed responses. On the other hand, economists or firms, will tend to emphasize maximizing returns on a particular site over a specific period of time.

Conclusion: Urban Eco-Governance

The city is today a strategic space for the direct and often brutal encounter between forces enormously destructive of the environment and increasingly acute needs for environmental viability. Much of what we keep describing as global environmental challenges becomes concrete and urgent in cities. This points to two critical dimensions. One is that urban governance must aim at corresponding with the development of environmentally sustainable urbanization. Secondly, this correspondence should, in turn, maximize recognition of the multiple ecologies in, respectively, cities and nature. Each point in these ecologies should be a bridge articulating the city and the environment.

Diverse empirical conditions both push towards and enable this complex articulation between urban and nature's ecologies. For instance, most international and national environmental standards will also have to be implemented and enforced in cities, besides national and international levels. This is partly because cities incorporate a large share of all environmentally destructive processes, including many that are not exclusively urban, and partly because the multi-scalar character of cities entails incorporation of national and global processes. The obverse of this specificity is that each city's mix of elements has a certain particularity – as does its mode of insertion within local and regional ecosystems. Out of this particularity comes place-based knowledge, which can then be scaled-up and contribute to the understanding of national and global conditions. All of this matters because it is now urgent to make cities and urbanization part of the solution: we need to use and build upon those features of cities that can re-orient the material and organizational ecologies of cities towards positive interactions with nature's ecologies. These interactions, and the diversity of domains they cover, are themselves an emergent socio-ecological system that bridges the city's and nature's ecologies. Part of the effort is to maximize the chances that it has positive environmental outcomes. Specific features of cities that help are economies of scale, density and the associated potential for greater efficiency in resource use, and, important but often neglected, dense networks of communication that can serve as facilitators to institute environmentally sound practices in cities. More analytically, insofar as cities are constituted through various processes that produce space, time, place and nature, cities also contain the transformative possibilities embedded in these same processes. For example, the temporal dimension becomes critical in environmentally sound initiatives: thus ecological economics helps us recognize the efficient and value-adding character of the longer temporal

frames of environmentally sound criteria. Conventional market criteria, with their increasingly shorter temporal evaluation frames, might characterize much of this as inefficient or value-losing.

Cities have long been sites for innovation and for developing and instituting complex physical and organizational systems. Up till now many of these systems have been driven by narrow market criteria and corporate profit logics. Here we need to return to the distinction between form and content: it is now time to develop and implement complex systems that address our environmental challenges. It is within the complexity of the city that we can find solutions to at least some of the environmental damage and that we can find some of the key formulas for reconfiguring the socio-ecological system that is urbanization. Cities also contain the networks and information loops that may facilitate communicating, informing, and persuading households, governments, and firms to support and participate in environmentally sensitive programs and in radically transformative institution building.

A city is a microcosm of the complex mix of variables we need to factor into our programs of change. Urban systems entail systems of social relations that support the current politico-economic organization, systems which we will have to dismantle partly, or fully in some cases. Cities are complex systems in their geographies of consumption and of waste-production and this complexity also makes them crucial to the production of solutions. Some of the geographies for sound environmental action in cities will also operate worldwide. The network of global cities described earlier becomes a space at the global scale for the management of investments but also potentially for the re-engineering of environmentally destructive global capital investments into more responsible investments. It contains the sites of power of some of the most destructive actors but potentially also the sites for demanding accountability of these actors. The scale of the network is different from the scale of the individual cities constituting this network. The circular logic environmentalists want to introduce in the functioning of cities, i.e. maximum re-use of outputs to minimize waste, will entail spatial circuits that operate at different scales. Some will be internal to households, others will be city wide and yet others will go beyond the city and run through places around the globe.

Bibliography

- Burgess R., Carmona M., and Kolstee T., eds. (1997). *The Challenge of Sustainable Cities: Neoliberalism and Urban Strategies in Developing Countries*. London and New York: Zed Books.
- Daly, H. E. and J. Farley. 2003. *Ecological Economics: Principles and Applications*. Washington, DC: Island Press.
- Environment and Urbanization. 2007. "Special Issue: Reducing the Risk to Cities from Disasters and Climate Change." Vol, 19, No.1. <http://eau.sagepub.com/content/vol19/issue1/>
- Etsy, Daniel C. and Maria Ivanova. 2005. "Globalisation and Environmental Protection: A Global Governance Perspective" In *A Handbook of Globalisation and Environmental Policy: National Government Interventions in a Global Arena* ed. Frank Wijen et al. Cheltenham, UK: Edward Elgar.
- Low Nicholas P. and B. Gleeson, eds. 2001. *Governing for the Environment: Global Problems, Ethics and Democracy*. Basingstroke, United Kingdom: Palgrave Publishers Ltd.
- Redclift, Michael. 2009. "The Environment and Carbon Dependence: Landscapes of Sustainability and Materiality." *Current Sociology*, 57(3): 369-387.
- Rees, William E. 2006. "Ecological Footprints and Bio-Capacity: Essential Elements in Sustainability Assessment." Chapter 9 in Jo Dewulf and Herman Van Langenhove, eds. *Renewables-Based Technology: Sustainability Assessment*, pp. 143-158. Chichester, UK: John Wiley and Sons.
- Sassen, Saskia. 2005. "The Ecology of Global Economic Power: Changing Investment Practices to Promote Environmental Sustainability." *Journal of International Affairs*, vol. 58 (Spring), nr. 2: 11-33.
- _____. 2006. *Human Settlement and the Environment*. Vol. 14 of the EOLSS Encyclopedia of the Environment. Oxford: EOLSS and UNESCO.
- Satterthwaite, David, Saleemul Huq, Mark Pelling, Hannah Reid, and Patricia Romero Lankao. 2007. "Adapting to Climate Change in Urban Areas: The possibilities and constraints in low- and middle-income nations." *Human Settlements Discussion Paper Series*. London: IIED. <http://www.iied.org/pubs/pdfs/10549IIED.pdf>.

The Section of Foresight Bureau of Strategic Planning www.unesco.org/bsp

Keeping an eye on tomorrow is one of the guiding principles of UNESCO, where the foresight function plays an essential part in identifying possible futures and exploring new paths for action in all its fields of competence. Serving as a laboratory of ideas, UNESCO is called to tackle today's challenges and prepare for those of tomorrow, as well. Anticipation and foresight are interdisciplinary activities aiming at enriching the international public debates.

The Foresight Programme of UNESCO is implemented through a dedicated intersectoral platform. Its purpose is to sensitize UNESCO community at large about foreseeable evolutions and future trends in education, the natural sciences, the social and human sciences, culture and information and communication. The Foresight Programme aims at bringing to bear intellectual perspectives, contributions and support to the Organisation's reflection, programming and action. Moreover, it will support Member States in developing their own capacities and approaches in the field of foresight.

The themes addressed by the Section include: the global financial crisis and the responses to its consequences, the green society and the green economy, climate change and biodiversity, the New Humanism for the 21st Century, knowledge societies, knowledge acquisition and sharing, the future challenges of groups of countries such as the middle-income countries or the Small Island Developing States, gender equality, or innovative financing in education.

In order to foster the reflection on these key future-oriented issues in the domains of the Organization, the Foresight programme of UNESCO organizes a diversified range of events at UNESCO Headquarters in Paris and at locations in various regions of the world. These events are conceived as a contribution to global debates on some of the key challenges of our time:

- The **UNESCO Future Forum** series brings together leading scientists, intellectuals, artists and decision-makers from all parts of the world in a spirit of forward-looking interdisciplinary inquiry.
- The **UNESCO Future Lectures** cycle offers world renowned personalities to share their views with an audience including representatives of the Member States, the Secretariat, intellectual and scientific communities, the media and the public at large.
- The **UNESCO Future Seminars** gather high-level experts on select strategic and technical issues.

The results and recommendations of Foresight activities are disseminated through a dedicated UNESCO portal website and through networks and partners in the field of future-oriented thinking. The results of activities are also being published as brochures.

In the face of the global environmental challenge and its manifold dimensions – climate change, biodiversity losses, water shortages, desertification, deforestations, unsustainable land uses – the future needs a green economy and green societies.

The green economy is an economy based on sober and clean growth, but also an economy where investment in sciences and technology is essential. Sustainable development however calls for more than technical and economic measures. The green economy must be accompanied by the vision of a global green society.

The project of a green society rests on the resolute assertion of ethical and moral values. They should ultimately complement the political and economic pillars of the international response to environmental challenges. UNESCO is committed to stimulate the debate on these issues.

“We need to dedicate ourselves collectively to sustainability”

Irina Bokova

Director-General of UNESCO