

## Climate Change and Adaptation

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### Abstract

The science has become more irrevocable than ever: Climate change is happening. The evidence is all around us. And unless we act, we will see catastrophic consequences including rising sea levels, droughts and famine, and the loss of up to a third of the world's plant and animal species. We need a new global agreement to tackle climate change, and this must be based on the soundest, most robust and up-to-date science available. Through its overview of the latest definitive science, this Climate Change Science Compendium reaffirms the strong evidence outlined in the

IPCC's 4th Assessment Report that climate change is continuing apace. In fact, this report shows that climate change is accelerating at a much faster pace than was previously thought by scientists. New scientific evidence suggests important tipping points, leading to irreversible changes in major Earth systems and ecosystems, may already have been reached or even overtaken.

Climate change, more than any other challenge facing the world today, is a planetary crisis that will require strong, focused global action. As pressures build for an internationally agreed response, we now have a once-in-a-generation opportunity to come together and address climate change through a newly invigorated multilateralism. This will be our chance to put in place a climate change agreement that all nations can embrace – an agreement that is equitable, balanced and comprehensive. This Climate Change Science Compendium is a wake-up call. The time for hesitation is over. We need the world to realize, once and for all, that the time to act is now and we must work together to address this monumental challenge. This is the moral challenge of our generation.

**KEYWORDS:** Climate change, Impact for climate change, Need for adaptation, level of the climate change.

### 1.0 Introduction:

Over the next decades, it is predicted that billions of people, particularly those in developing countries, face shortages of water and food and greater risks to health and life as a result of climate change. Concerted global action is needed to enable developing countries to adapt to the effects of climate change that are happening now and will worsen in the future. Under a business as usual scenario, greenhouse gas emissions could rise by 25 – 90 per cent by 2030 relative to 2000 and the Earth could warm by 3°C this century. Even with a temperature rise of 1– 2.5°C the IPCC predict serious effects including reduced crop yields in tropical areas leading to increased risk of hunger, spread of climate sensitive diseases such as malaria, and an increased risk of extinction of 20 – 30 per cent of all plant and animal species. By 2020, up to 250 million people in Africa could be exposed to greater risk of water stress. Over the course of this century, millions of people living in the catchment areas of the Himalayas and Andes face increased risk of floods as glaciers retreat followed by drought and water scarcity as the once extensive glaciers on these mountain ranges disappear. Sea level rise will lead to inundation of coasts worldwide with some small Island States possibly facing complete inundation and people living with the constant threat of tropical cyclones now face increased severity and possibly increased frequency of these events with all associated risks to life and livelihoods. Developing countries are the most vulnerable to climate change impacts because they have fewer resources to adapt: socially, technologically and financially. Climate change is anticipated to have far reaching effects on the sustainable development of developing countries including their ability to attain the United Nations Millennium Development Goals by 2015 (UN 2007). Many developing countries' governments have given adaptation action a high, even urgent, priority. Developing countries need international assistance to support

adaptation in the context of national planning for sustainable development, more capacity-building and transfer of technology and funds. Systematic planning and capacity-building are also needed to reduce the risk of disasters and raise the resilience of communities to increasing extreme events such as droughts, floods and tropical cyclones. Funding for adaptation in developing countries must be sufficient and sustained. Least developed countries (LDCs) and Small Island developing States (SIDS) in particular need special consideration due to their extreme vulnerability.

### 1.1 Objectives of the study:

1. To study the climate change and adaptation.
2. To study the impact of climate change.
3. To study the need for adaptation.
4. To examine the place, area and level of the climate change.

### 1.2 Methodology:

The study is based on secondary data derived from various published sources. The required data is collected from UNFCCC website reports on climate change & adaptation, from journal and books. Climate change survey of world 2009-10, 2010-11 and other related research papers, books and published work.

### 2.0 Climate Change and Adaptation:

Rising fossil fuel burning and land use changes have emitted, and are continuing to emit, increasing quantities of greenhouse gases into the Earth's atmosphere. These greenhouse gases include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrogen dioxide (N<sub>2</sub>O), and a rise in these gases has caused a rise in the amount of heat from the sun withheld in the Earth's atmosphere, heat that would normally be radiated back into space. This increase in heat has led to the greenhouse effect, resulting in climate change. The main characteristics of climate change are increases in average global temperature (global warming); changes in cloud cover and precipitation particularly over land; melting of ice caps and glaciers and reduced snow cover; and increases in ocean temperatures and ocean acidity – due to seawater absorbing heat and carbon dioxide from the atmosphere (Figure II-1).

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC 2007) dispelled many uncertainties about climate change. Warming of the climate system is now unequivocal. It is now clear that global warming is mostly due to man-made emissions of greenhouse gases (mostly CO<sub>2</sub>). Over the last century, atmospheric concentrations of carbon dioxide increased from a pre-industrial value of 278 parts per million to 379 parts per million in 2005, and the average global temperature rose by 0.74° C. According to scientists, this is the largest and fastest warming trend that they have been able to discern in the history of the Earth. An increasing rate of warming has particularly taken place over the last 25 years, and 11 of the 12 warmest years on record have occurred in the past 12 years. The IPCC Report gives detailed projections for the 21st century and these show that global warming will continue and accelerate. The best estimates indicate that the Earth could warm by 3° C by 2100. Even if countries reduce their greenhouse gas emissions, the Earth will continue to warm. Predictions by 2100 range from a minimum of 1.8° C to as much as 4° C rise in global average temperatures.

### 2.1 Need for Adaptation:

The major impacts and threats of global warming are widespread (Figure II-1). Increasing ocean temperatures cause thermal expansion of the oceans and in combination with melt water from land-based ice this is causing sea level rise. Sea levels rose during the 20th century by 0.17 metres. By 2100, sea level is expected to rise between 0.18 and 0.59 metres. There are uncertainties in this estimate mostly due to uncertainty about how much water will be lost from ice sheets (Bindoff *et al.* 2007), for example Greenland is showing rising loss of mass in recent years (UNEP 2007). Increased melting of sea ice and freshwater influx from melting glaciers and ice sheets also has the potential to influence global patterns of ocean circulation. As a result of global warming, the type, frequency and intensity of extreme events, such as

tropical cyclones (including hurricanes and typhoons), floods, droughts and heavy precipitation events, are expected to rise even with relatively small average temperature increases. Changes in some types of extreme events have already been observed, for example, increases in the frequency and intensity of heat waves and heavy precipitation events (Meehl *et al.* 2007). Climate change will have wide-ranging effects on the environment, and on socio-economic and related sectors, including water resources, agriculture and food security, human health, terrestrial ecosystems and biodiversity and coastal zones. Changes in rainfall pattern are likely to lead to severe water shortages and/or flooding. Melting of glaciers can cause flooding and soil erosion. Rising temperatures will cause shifts in crop growing seasons which affects food security and changes in the distribution of disease vectors putting more people at risk from diseases such as malaria and dengue fever. Temperature increases will potentially severely increase rates of extinction for many habitats and species (up to 30 per cent with a 2° C rise in temperature). Particularly affected will be coral reefs, boreal forests, and Mediterranean and mountain habitats. Increasing sea levels mean greater risk of storm surge, inundation and wave damage to coastlines, particularly in Small Island States and countries with low lying deltas. A rise in extreme events will have effects on health and lives as well as associated environmental and economic impacts. Adaptation is a process through which societies make themselves better able to cope with an uncertain future. Adapting to climate change entails taking the right measures to reduce the negative effects of climate change (or exploit the positive ones) by making the appropriate adjustments and changes. There are many options and opportunities to adapt. These range from technological options such as increased sea defences or flood-proof houses on stilts, to behaviour change at the individual level, such as reducing water use in times of drought and using insecticide-sprayed mosquito nets. Other strategies include early warning systems for extreme events, better water management, and improved risk management, various insurance options and biodiversity conservation. Because of the speed at which change is happening due to global temperature rise, it is urgent that the vulnerability of developing countries to climate change is reduced and their capacity to adapt is increased and national adaptation plans are implemented. Future vulnerability depends not only on climate change but also on the type of development path that is pursued. Thus adaptation should be implemented in the context of national and global sustainable development efforts. The international community is identifying resources, tools and approaches to support this effort.

## **2.2 Adaptation and UNFCCC:**

At the centre of efforts to address climate change on the international stage is the United Nations Framework Convention on Climate Change (UNFCCC). “The UNFCCC provides the basis for concerted international action to mitigate climate change and to adapt to its impacts. Its provisions are far-sighted, innovative and firmly embedded in the concept of sustainable development” (UNFCCC 2006a). The UNFCCC entered into force on 21st March 1994 and there are now 191 Parties (member countries) to the Convention, an almost global membership. These members are committed to: launch national strategies for adapting to expected impacts, including the provision of financial and technological support to developing countries, and to cooperate in preparing for adaptation to the impacts of climate change.

## **3.0 Convention Articles Referring To Adaptation:**

All Parties are to “formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to ... facilitate adequate adaptation to climate change”. Article 4.1(b) All Parties shall “Cooperate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management, water resources and agriculture, and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods”. Article 4.1(e) All Parties shall “Take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment, of projects or measures undertaken by them to mitigate or adapt to climate change”. Article 4.1(f) “The developed country Parties ... shall also assist the developing country Parties that are particularly vulnerable

to the adverse effects of climate change in meeting costs of adaptation to those adverse effects”. Article 4.4 “The Parties shall give full consideration to what actions are necessary under the Convention, including actions related to funding, insurance and the transfer of technology, to meet the specific needs and concerns of developing country Parties arising from the adverse effects of climate change and/or the impact of the implantation of response measures”. Article 4.8 “The Parties shall take full account of the specific needs and special situations of the least developed countries in their actions with regard to funding and transfer of technology”.

### **3.0 Assessing the Impacts Of and Vulnerability and Adaptation To, Climate Change:**

Assessing the impacts of and vulnerability to climate change and subsequently working out adaptation needs requires good quality information. This information includes climate data, such as temperature, rainfall and the frequency of extreme events, and non-climatic data, such as the current situation on the ground for different sectors including water resources, agriculture and food security, human health, terrestrial ecosystems and biodiversity, and coastal zones.

The UNFCCC-organized workshops and meeting in 2006 – 2007 highlighted that there is still a need to take stock of available climate information in developing countries so that it is clear where the systematic observation needs are most pressing. Follow-up actions include improving and sustaining operational observing networks, such as the GCOS observational networks. Collaboration between national and international providers of climate information and the users, in all sectors, of such information for adaptation to climate change is vital as well as generating awareness among different user communities of the usefulness of climate information and services and improving national and regional coordination. Data needs to be carefully packaged so that it can be used effectively. Rescuing historical meteorological data is important. Education and training and improved national planning and reporting would also help build capacity.

At the workshops and meeting, it was highlighted that it is not just climate data that is needed for effective vulnerability and adaptation assessments to climate change in developing countries. Equally as important, and very much lacking at present, is the need for accurate socio-economic data. This data needs to come from across sectors and is an important complement to existing assessments, particularly given that poverty has been recognized as a major factor in vulnerability.

The development of higher resolution regional models for developing countries is important as well as analysing the disparity between the model outcomes. This would help enhance capacity for reaching informed decision making. For example, at the Africa workshop, participants emphasised the need to develop regional climate models to provide fine-scale climate information for long-term impact studies and forecasting, as well as facilitate information exchange between African institutions. Some efforts are being undertaken in this regard in developing countries, and regional models are being developed that are capable of providing more useful information needed by planners and policy makers. For example, the Hadley Centre’s model PRECIS (Providing Regional Climates for Impacts Studies) 10 has been designed for use by local meteorological offices or research institutes. Training on this model has been undertaken in several developing countries, including Cuba, Brazil, Argentina, South Africa and India, and Jamaica, Cuba and Barbados mentioned at the expert meeting that results from the model have been used in vulnerability assessments.

### **3.1 Adaptation to Climate Change:**

Adapting to climate change will entail adjustments and changes at every level – from community to national and international. Communities must build their resilience, including adopting appropriate technologies while making the most of traditional knowledge, and diversifying their livelihoods to cope with current and future climate stress. Local coping strategies and traditional knowledge need to be used in synergy with government and local interventions. The choice of adaptation interventions depends on national

circumstances. To enable workable and effective adaptation measures, ministries and governments, as well as institutions and non-government organizations, must consider integrating climate change in their planning and budgeting in all levels of decision making.

Sectoral adaptation measures look at actions for individual sectors that could be affected by climate change. For example, in agriculture, reduced rainfall and higher evaporation may call for the extension of irrigation; and for coastal zones, sea level rise may necessitate improved coastal protection such as reforestation. Often adaptation measures in one sector will involve strengthening of the policy that already exists, emphasizing the importance of including long term climate change considerations along with existing local coping mechanisms and integrating them into national development plans. Multi-sectoral adaptation options relate to the management of natural resources which span sectors, for example, integrated management of water, river basins or coastal zones. Linking management measures for adaptation to climate change with management measures identified as necessary from the other Rio Conventions: the Convention on Biological Diversity and the United Nations Convention to Combat Desertification; could be a useful multi-sectoral approach which addresses a range of environmental stresses. Cross-sectoral measures also span several sectors and can include: improvements to systematic observation and communication systems; science, research and development and technological innovations such as the development of drought-resistant crop varieties or new technologies to combat saltwater intrusion; education and training to help build capacity among stakeholders; public awareness campaigns to improve stakeholder and public understanding on climate change and adaptation; strengthening or making changes in the fiscal sector such as new insurance options; and risk/ disaster management measures such as emergency plans. For example, Bhutan's NAPA provides an example of a cross-sectoral adaptation project. It identifies the need for a forecasting and early warning system to provide seasonal forecasts for supporting agricultural production decisions and provide an early warning system and disaster management strategy for food security and emergency medicine to vulnerable communities in the case of extreme events.

Adaptation to climate change must also occur through the prevention and removal of maladaptive practices. Maladaptation refers to adaptation measures that do not succeed in reducing vulnerability but increase it instead. Examples of measures that prevent or avoid maladaptation include: better management of irrigation systems; and removal of laws that can inadvertently increase vulnerability such as destruction of mangroves and relaxation of building regulations on coasts and in floodplains.

## **I. Water Resources**

### **Reactive adaptation**

- Protection of groundwater resources
- Improved management and maintenance of existing water supply systems
- Protection of water catchment areas
- Improved water supply
- Groundwater and rainwater harvesting and desalination

### **Anticipatory adaptation**

- Better use of recycled water
- Conservation of water catchment areas
- Improved system of water management
- Water policy reform including pricing and irrigation policies
- Development of flood controls and drought monitoring

## **II. Agriculture and food security**

### **Reactive adaptation**

- Erosion control
- Dam construction for irrigation

- Changes in fertilizer use and application
- Introduction of new crops
- Soil fertility maintenance
- Changes in planting and harvesting times
- Switch to different cultivars
- Educational and outreach programmes on conservation and management of soil and water

#### **Anticipatory adaptation**

- Development of tolerant/resistant crops (to drought, salt, insect/pests)
- Research and development
- Soil-water management
- Diversification and intensification of food and plantation crops
- Policy measures, tax incentives/subsidies, free market
- Development of early warning systems

### **III. Human health**

#### **Reactive adaptation**

- Public health management reform
- Improved housing and living conditions
- Improved emergency response

#### **Anticipatory adaptation**

- Development of early warning system
- Better and/or improved disease/vector surveillance and monitoring
- Improvement of environmental quality
- Changes in urban and housing design

### **IV. Terrestrial ecosystems**

#### **Reactive adaptation**

- Improvement of management systems including control of deforestation, reforestation and a forestation
- Promoting agro forestry to improve forest goods and services
- Development/improvement of national forest fire management plans
- Improvement of carbon storage in forests

#### **Anticipatory adaptation**

- Creation of parks/reserves, protected areas and biodiversity corridors
- Identification/development of species resistant to climate change
- Better assessment of the vulnerability of ecosystems
- Monitoring of species
- Development and maintenance of seed banks
- Including socioeconomic factors in management policy

### **V. Coastal zones and marine Ecosystems**

#### **Reactive adaptation**

- Protection of economic infrastructure
- Public awareness to enhance protection of coastal and marine ecosystems
- Building sea walls and beach reinforcement
- Protection and conservation of coral reefs, mangroves, sea grass and littoral vegetation

**Anticipatory adaptation**

- Integrated coastal zone management
- Better coastal planning and zoning
- Development of legislation for coastal protection
- Research and monitoring of coasts and coastal Ecosystems

**3.2 Priority Adaptation Projects:**

- improved forecasting for farming, extreme events and disaster management;
- improved water management for drinking and agriculture through understanding water flows and water quality, improved rainwater harvesting and water storage and diversification of irrigation techniques;
- improved food security through crop diversification, developing and introducing drought, flood and saline tolerant crops, improving livestock and fisheries breeding and farming techniques, developing local food banks for people and livestock, and improving local food preservation;
- better land and land use management through erosion control and soil conservation measures, agro forestry and forestry techniques, forest fire management and finding alternative energy sources to wood and charcoal, as well as better town planning;
- coastal zone management including coral monitoring and restoration and improving coastal defences through a forestation, reforestation, set-back areas and vegetation buffers;
- improved health care through flood shelters and assistance shelters as part of community emergency preparedness programmes, better health education, better access to primary health care such as distribution of treated mosquito nets and better malaria surveillance programmes and habitat clearance;
- capacity-building to integrate climate change into sectoral development plans, involving local communities in adaptation activities, raising public awareness and education on climate change, and enabling representation at international meetings;
- And promotion of sustainable tourism.

**4.0 Funding For Adaptation:**

Funding is vital in order for developing countries to plan for and implement adaptation plans and projects. A basic conclusion of the Stern Review is that the costs of strong and urgent action on climate change will be less than the costs thereby avoided of the impacts of climate change under business as usual (Stern 2006). All countries, rich and poor, need to adapt to climate change, and this will be costly. Developing countries, already the hardest hit by climate change, have little capacity (both in terms of human capacity and financial resources) to adapt. Financial ways and means must be found to enable developing countries to enhance their efforts to adapt. At the workshops and meeting the lack of funding available for adaptation was highlighted as a large impediment to implementing adaptation plans. Accessing the funds which are available at present was identified as complex and lengthy. Even if this process were to be streamlined, a lot more funding would still be required for adaptation. New international financial mechanisms to provide a sustained and sufficient response to adaptation are needed.

At the workshops and meeting, participants emphasised the need for sustained financing for adaptation. Without sustained funding, adaptation runs the risk of not being effectively addressed, and largely limited to “reactive” funding, such as short-term emergency relief. This would be unresponsive of sustainable development and ultimately prove to be very costly. Funding is required for all developing countries to develop national adaptation strategies or action plans. These plans should exist at all levels: local, provincial and national. Article 4 of the Convention highlights that developed country Parties shall provide financial resources to assist developing country Parties adapt to climate change. To facilitate this, the Convention assigned to the GEF the responsibility of operating its financial mechanism. The GEF enables a transfer of financial resources from developed to developing countries by establishing operational programmes, providing programming documents and allocating resources. Based on guidance from the UNFCCC, the GEF operates three funds. These are the GEF Trust Fund; the Least Developed Countries Fund (LDCF) and

the Special Climate Change Fund (SCCF). Further funding opportunities currently available for developing countries to fund adaptation projects include: the future Adaptation Fund under the Kyoto Protocol, funds from other multilateral environmental agreements (MEAs), and bilateral and multilateral funding from governments, national and international organizations and agencies.

The funds that are currently available under the Convention and the Kyoto Protocol are small compared to the magnitude of the needs identified by the UNFCCC. The financial resources available for adaptation in the funds currently operated by the GEF (Trust Fund, LDCF and SCCF) amounted to about USD 275 million as of August 2007. The Adaptation Fund could receive USD 80 – 300 million per year for the period 2008 – 2012. Assuming a share of proceeds for adaptation of 2 per cent continues to apply post 2012, the level of funding could be: USD 100 – 500 million per year for a low demand for the CDM; and USD 1– 5 billion per year for a high demand. However, there is still a deficit in funding that needs to be filled.

#### **4.1 Possible cost-effective insurance initiatives for developing countries to help adaptation to climate change:**

- Innovative risk transfer mechanisms such as multi-state risk pooling mechanisms;
- Regional reinsurance facilities, either through the private market or from the state, whereby the re-insurer assumes responsibility for covering a portion of the risk, especially for rare but extreme event losses;
- Catastrophe funds linked to international financial markets – that pay out on a trigger condition, such as temperatures over a certain value for a certain length of time, rather than on proof of loss;
- National/regional disaster funds supported financially by the international community;
- Micro-finance and micro-insurance;
- Public-private partnerships, such as the UNEP FI;
- Generation of carbon credits in exchange for support for insurance;
- Weather derivatives which provide payouts in response to weather triggers rather than in response to demonstrated losses;
- An international insurance pool – proposed by the Alliance of Small Island States in 1992, it was suggested that payments into an insurance pool would be a form of compensation linked to responsibility or liability for the impacts of climate change.

#### **4.2 Impacts of Climate Change on the Millennium Development Goals:**

##### **Goal 1 (Eradicate extreme poverty and Hunger)**

- Damage to livelihood assets, including homes, water supply, health, and infrastructure, can undermine peoples' ability to earn a living;
- Reduction of crop yields affects food security;
- Changes in natural systems and resources, infrastructure and labour productivity may reduce income opportunities and affect economic growth;
- Social tensions over resource use can lead to conflict, destabilising lives and livelihoods and forcing communities to migrate.

##### **Goal 2 (Achieve universal primary Education)**

- Loss of livelihood assets and natural disasters reduce opportunities for full time education, more children (especially girls) are likely to be taken out of school to help fetch water, earn an income or care for ill family members;
- Malnourishment and illness reduces school attendance and the ability of children to learn when they are in class;
- Displacement and migration can reduce access to education.

##### **Goal 3 (Promote gender equality and empower women)**

- Exacerbation of gender inequality as women depend more on the natural environment for their livelihoods, including agricultural production. This may lead to increasingly poor health and less time to engage in

decision making and earning additional income;

– Women and girls are typically the ones to care for the home and fetch water, fodder, firewood, and often food. During times of climate stress, they must cope with fewer resources and a greater workload; – Female headed households with few assets are particularly affected by climate related disasters.

Goal 4 (Reduce child mortality)

Goal 5 (Improve Maternal Health)

– Deaths and illness due to heat-waves, floods, droughts and hurricanes;

– Children and pregnant women are particularly susceptible to vector-borne diseases (e.g. malaria and dengue fever) and water-borne diseases (e.g. cholera and dysentery) which may increase and/or spread to new areas – e.g. anaemia resulting from malaria is currently responsible for one quarter of maternal mortality;

– Reduction in the quality and quantity of drinking water exacerbates malnutrition especially among children;

– Natural disasters affect food security leading to increased malnutrition and famine, particularly in sub-Saharan

Africa.

Goal 6 (Combat HIV/AIDS, malaria and other diseases)

– Water stress and warmer conditions encourage disease;

– Households affected by AIDS have lower livelihood assets, and malnutrition accelerates the negative effects of the disease.

Goal 7 (Ensure environmental Sustainability)

– Alterations and possible irreversible damage in the quality and productivity of ecosystems and natural resources;

– Decrease in biodiversity and worsening of existing environmental degradation;

– Alterations in ecosystem-human interfaces and interactions lead to loss of biodiversity and loss of basic support systems for the livelihood of many people, particularly in Africa.

Goal 8 (Develop a global partnership for Development)

– Climate change is a global issue and a global challenge: responses require global cooperation, especially to help developing countries adapt to the adverse effects of climate change;

-International relations may be strained by climate impacts.

## 5.0 Conclusion:

Developing countries are already suffering from the impacts of climate change and are the most vulnerable to future change. A number of developing countries have developed adaptation plans or are in the process of finalizing them. This includes the National Adaptation Programmes of Action of least developed countries. There is now urgency for developing countries to find ways to implement these plans. Against a backdrop of low human and financial capacity, developing countries lack many of the resources to do this on their own.

Adaptation is already considered a vital part of any future climate change regime. Within the UNFCCC and the international community, deliberations are building to find an effective means to tackle climate change, which is described by UN Secretary General Ban Ki-moon as the “defining issue of our era”. Future decisions within the UNFCCC negotiating process must assist developing countries in a streamlined, innovative and transparent way, with transfer of knowledge, technology and financial resources to adapt and to adapt at all levels and in all sectors.

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