

# Upholding the Spirit of Rights and Justice at the COP 15 in Copenhagen

LDC Watch, December 2009 (Revised Edition)



Koshi River Flood (Nepal): 2008, Photo Source: RRN

## Summary

The 15<sup>th</sup> Conference of the Parties (COP 15) of the United Nations Framework Convention on Climate Change (UNFCCC) is aimed at hammering out a global climate deal to limit greenhouse gas (GHG) emissions when the Kyoto Protocol's first commitment period expires at the end of 2012. The deadline comes in December at the annual UN climate conference in Copenhagen, where a deal is supposed to be sealed. The new deal is to tackle the causes of climate change (mitigation) and to assist countries to cope with the impacts of climate change that we can no longer avoid (adaptation). Though, the present day's climate crisis is the result of imbalance in nature of the world economy due to the aggressive nature of capital and historical

and cumulative build-up of resources by the developed countries; ironically, people in the developing countries especially the least developed countries (LDCs)<sup>1</sup> and the Small Island Developing States (SIDS)<sup>2</sup> are, and will continue to bear the brunt of its impacts, which is likely to roll back the hard-earned gains in poverty reduction and progress on the Millennium Development Goals (MDGs) (UNDP 2007). Besides the impacts of climate change and its socio-economic implications to the societies and communities have been widening inequalities, especially in the LDCs.

The Copenhagen deal should be a 'deal of justice' for the most affected communities and countries; and this should be embedded in a framework of sustainable development which gives framework while giving equal importance to adaptation and mitigation.

Most importantly, the Copenhagen Climate Deal should provide post-2012 framework for both environmental space and development policy choice for the LDCs and developing countries. Any new climate change regime that does not address these facts will be environmentally, politically, socially, morally and economically unsustainable and unjustified. Developed countries should lead the way in reducing their GHG emissions and work with the developing countries to create development space and help make a transformation to low- carbon and green technologies.

## Climate Change Impacts in the LDCs

Although the rich countries and their economic policy instruments are largely responsible for the climate crisis, its impacts are disproportionately and unfairly affecting especially the LDCs. very unevenly and disproportionately. There are cascading effects of climate change, with some areas becoming drier due to more heat and evaporation, such as the Sahel, the Mediterranean basin, Southern Africa, and parts of Southern Asia (World Bank 2009). Other areas are experiencing increased and more variable precipitation such as Central Asia. In South Asia, the impacts of higher temperatures, more variable precipitation, more extreme weather events, and sea level rise will likely continue to intensify. In this backdrop, the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) published in 2007, identified for the first time, identified regions most likely to be affected by climate change. The most vulnerable regions are: the Arctic, because of high rates of projected warming on sensitive natural systems; Africa, especially the Sub-Saharan Region, because of low adaptive capacity and projected changes in rainfall; Small Island States, because of high exposure of the population and infrastructure to the risk of sea-level rise and increased storm surges, and; and Asian mega-deltas such as the Ganges-Brahmaputra and Mekong, because of their large populations and high exposure to sea-level rise, storm surges, and river flooding ( IPCC 2007). Ironically, most of the LDCs are located in the regions sensitive to climate change, as specified by the IPCC Fourth Assessment Report. Meanwhile, these changes are already having impacts on the lives and livelihoods of millions of people living in LDCs and SIDS. Extreme weather events caused by climate change such as droughts, floods and storms are often terrible experiences for those affected; they cause great loss of life, destroy countless livelihoods and leave millions of people displaced and devastated.

While climate change is undoubtedly a scientific issue, on the impact level, it is primarily a justice issue, specifically in particular for the LDCs. People in the poor countries who are mostly concentrated in the fragile agro-ecological zones, living in low lying coastal and flood prone areas, and have limited access to basic rights and services, are

becoming increasingly vulnerable to the harmful impacts of climate change. They are also at the forefront of being victimised by social, cultural and economic insecurity and conflicts over water, food and shelter.

Again, in the coming decades, climate change is expected to exacerbate the risks of disasters, not only from more frequent and intense hazard events but also through greater vulnerability to the existing hazards. The other adverse impacts of climate change, for example on public health, ecosystems, food security, migration and on the situation of specially vulnerable groups such as children, the elderly and women, will increase the vulnerability of communities to natural hazards of all types. Many of the countries that are already of humanitarian concern and which have populations that are highly vulnerable will face even greater risk owing to the impact of climate change.

## Social and Economic Implications of Climate Change in the LDCs

Climate change is a consequence of social and economic injustices that humankind, especially from the developed nations – noted as the Annex I Parties by the UNFCCC – have created over past years to satisfy their wants in an unsustainable manner. The causes and consequences of climate change are deeply intertwined with global patterns of inequality, which have structurally made some countries poor, such as the LDCs, where around 785 million people – just over 10 per cent of the world's population - live their lives confronting social injustice, economic disparity and poverty. LDCs have a per capita Gross Domestic Product (GDP) under \$900 and have very low levels of capital, human and technological development. In fact, the LDCs have always faced several daunting structural constraints, some of which have been inherited from their colonial past and some of which are imposed to the LDCs as a tool of exploitation and domination such as the neo-liberal economic policies that have shaped the existing development paradigm. The recent Human Development Report stated that 'there are glaring inequalities in the distribution of responsibility of the causes of climate change and its impacts among the nations and peoples of the world' (UNDP 2007). Poor people in the developing and least developed countries are bearing the brunt of its impacts while contributing very little to its causes.

LDCs' existing concerns about food security, water scarcity and energy are made all the more difficult by climate risks that will challenge the goals of inclusive and environmentally sustainable economic growth. Likewise, the social and economic dimensions of climate change will result in unprecedented development and security challenges to the efforts of LDCs towards growth and development; this situation also would hold back the achievement of MDGs, especially the goals of eradicating

poverty, combating communicable diseases, and ensuring environmental sustainability etc. Major incidents that would affect the poverty reduction strategies and MDGs achievements are: (i) inundation or submersion of low-lying coastal areas due to sea level rise and displacement

of huge population; (ii) incremental cost of disaster risk reduction and financial loss due to increased level of disasters; (iii) intrusion of salinity and thereby scarcity of drinking water; (iv) reduction in crop production which is around up to 30 to 50 %, and; (v) increasing health hazards.

**Table 1: Examples of Some Projected Regional Impacts**

Region	Projected impacts
Africa	<ul style="list-style-type: none"> <li>- By 2020, between 75 and 250 million people are projected to be exposed to increased water stress due to climate change.</li> <li>- By 2020, in some countries, yield from rain-fed agriculture could be reduced by up to 50%. Agriculture production including access to food, in many African countries is projected to be severely compromised. This would further adversely affect food security and exacerbate malnutrition.</li> <li>- Towards the end of 21<sup>st</sup> Century, projected sea-level rise will affect low-lying coastal areas with large populations. The cost of adaptation could amount to at least 5 – 10% of Gross Domestic Product.</li> <li>- By 2020, an increase of 5 –8% of arid and semi-arid land in Africa is projected under a range of climate scenarios.</li> </ul>
Asia	<ul style="list-style-type: none"> <li>- By 2050, freshwater availability in Central, South, East and South-East Asia, particularly in the large river basins, is projected to decrease.</li> <li>- Coastal areas, especially heavily populated mega-delta regions in South, East and South-East Asia, will be at greatest risk due to increased flooding from the sea and, in some mega-deltas, flooding from the rivers.</li> <li>- Climate change is projected to compound the pressures on natural resources and the environment associated with rapid urbanization, industrialization and economic development.</li> <li>- Endemic morbidity and mortality due to diarrhoeal disease primarily associated with floods and droughts are expected to rise in East South and South-East Asia due to projected changes in the hydrological cycle.</li> </ul>
Latin America	<ul style="list-style-type: none"> <li>- By mid-century, increases in temperature and associated decreases in soil water are projected to lead to gradual replacement of tropical forest by savanna in eastern Amazonia. Semi arid vegetation will tend to be replaced by arid-land vegetation.</li> <li>- There is a risk of significant bio-diversity loss through species extinction in many areas.</li> <li>- Productivity of some important crops is projected to decrease and livestock productivity to decline, with adverse consequences for food security.</li> <li>- Changes in precipitation patterns and the disappearance of glaciers are projected to significantly affect water availability for human consumption, agriculture and energy generation.</li> </ul>
Small Island States	<ul style="list-style-type: none"> <li>- Sea-level rise is expected to exacerbate inundation, storm surge, erosion and other coastal hazards and thus threaten vital infrastructure, settlements and facilities that support the livelihoods of island communities.</li> <li>- By mid-century, climate change is expected to reduce water resources in many small islands, e.g. in the Caribbean and Pacific, to the point where they become insufficient to meet demand during low-rainfall period</li> <li>- Deterioration of coastal conditions.</li> </ul>

**Source:** IPCC 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II, III to the Fourth Assessment Report of the Intergovernmental Panel of Climate Change, IPCC, Geneva, Switzerland

**Table 2: Likely Implications of Climate Change for Realising the MDGs**

Millennium Development Goals	Likely impacts of climate change
Eradicate extreme poverty and hunger (Goal 1)	<ul style="list-style-type: none"> <li>- Climate change is projected to reduce poor people's access to livelihoods needs such as food, health, water, homes, and infrastructure, by impacting their livelihoods assets and thus further exacerbating the vulnerability context.</li> <li>- Climate change is altering the path and rate of economic growth due to changes in natural systems and resources, infrastructure, and labour productivity. A reduction in economic growth directly impacts poverty through reduced income opportunities.</li> <li>- Climate change is projected to alter regional food security. In Africa, in particular, food security is in jeopardy.</li> </ul>
Health-related goals: Combat major diseases Reduce infant mortality Improve maternal health (Goals 4, 5 and 6)	<ul style="list-style-type: none"> <li>- Direct effects of climate change include increases in heat-related mortality and illness associated with heat waves (which may be balanced by less winter cold-related deaths in some regions).</li> <li>- Climate change may increase the prevalence of some vector-borne diseases (for example, malaria and dengue fever), and vulnerability to water-, food- or person-to-person borne diseases such as cholera and dysentery.</li> <li>- Children and pregnant women are particularly susceptible to vector- and water-borne diseases. Anemia – resulting from malaria – is responsible for a quarter of maternal mortality.</li> <li>- Climate change is likely to result in declining quantity and quality of drinking water, which is a prerequisite for good health, and it may also exacerbate malnutrition – an important cause of ill health among children – by reducing natural resource productivity and threatening food security, particularly in Sub-Saharan Africa and other LDCs.</li> </ul>
Achieve universal primary education (Goal 2)	<ul style="list-style-type: none"> <li>- Links to climate change are less direct, but loss of livelihoods assets (social, natural, physical, human and financial capital) may reduce opportunities for full-time education in numerous ways. Natural disasters and drought reduce children's available time (which may be diverted to household tasks), while displacement and migration can reduce access to quality education opportunities.</li> </ul>
Promote gender equality and empower women (Goal 3)	<ul style="list-style-type: none"> <li>- Climate change is likely to exacerbate current gender inequalities. Depletion of natural resources and decreasing agricultural productivity may place additional burdens on women's health and reduce time available to participate in decision-making processes and income-generating activities.</li> <li>- Climate-related disasters have been found to impact more severely on female-headed households, particularly where they have fewer assets to support their livelihoods.</li> </ul>
Ensure environmental sustainability (Goal 7)	<ul style="list-style-type: none"> <li>- Climate change will alter the quality and productivity of natural resources and ecosystems, some of which may be irreversibly damaged; these changes may also decrease biological diversity and further accelerate the existing rate of environmental degradation.</li> </ul>
Global partnerships (Goal 8)	<ul style="list-style-type: none"> <li>- Climate change is a global issue and response requires global cooperation, especially to help developing countries to adapt to the adverse impacts of climate change. But, because of the impacts of climate change in the developed world as well, part of the development assistance which could have been set aside for the development of the developing countries is likely to be used responding climate change impacts back home, thus affecting the aid flows to the developing countries.</li> </ul>

**Source:** The World Bank 2009: Climate Change Strategy for South Asian Region

The LDCs that are already plagued by poverty, natural disasters, conflicts and geographical constraints, are further subjected to the devastating impacts of climate change, which are likely to lead the LDCs further to perpetual poverty, food and fuel crises, conflict, inequity, indebtedness and underdevelopment. There is also a growing concern that the impacts of climate change will be affecting the full enjoyment of the accepted human rights, including the rights to life, the right to take part in the social and cultural life, the right to use and enjoy property, the right to an adequate standard of living, the right to food, and the right to the highest attainable standard of physical and mental health.

Therefore, the global injustice of a world in which responsibility for the causes of climate change is inversely

proportional to the degree of vulnerability to its consequence calls for equity and justice to be placed at the heart of a responsive agenda on climate policy and action.

Thus the LDCs that are already experiencing the horrors of climate change must be compensated for the additional costs of adaptation and mitigation actions that go beyond their development objectives. This approach underlies the UNFCCC principle of “common but differentiated responsibilities”. It recognizes that current climate risks are the consequence of past actions by developed countries and there is a need for assuring equal and fair access to the global atmospheric commons. Moreover, Article 4.9 of the UNFCCC recognizes the special situations of the LDCs and states “The Parties shall take full account of the specific

**Table 3: Possible Human Rights Implications of Climate Change in the LDCs**

Impacts of climate change	Impacts on Human Systems	Rights Implicated	International Human Rights Instruments in effect
Rise of temperature	Increased water and food insecurity	Life and livelihoods	Universal Declaration of Human Rights (UDHR) 1948 Article 3 states that everyone has right to life, liberty and security. Similarly, Article 25 of UDHR and Article 11 of the International Covenant on Economic Social and Cultural Rights (ICESCR) 1966 obligates the State Parties to recognize the right of all persons to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions.
Risks of extreme weather events	Increased health risks/fatalities	Health	ICESCR 1966 Article 12 recognizes the right of everyone to enjoyment of the highest attainable standard of physical and mental health.
Threats to unique eco-systems	Changes in livelihoods	Means of subsistence	
Changes in precipitation patterns and distribution of water  Threats to biodiversity	Effects on the wider economy  Changes in water productivity and food production	Adequate standard of living  Water agricultural Property	ICESCR, 1966 Article 1.2 states that ‘in no case may a people be deprived of its own means of subsistence’. Similarly, Article 25 of UDHR and Article 11 of ICESCR are also being violated.
Sea-level rise, flooding and storm surges	Human settlement, land and property Damage to vital infrastructure Displacement and migration Decline in natural systems services	Self-determination, adequate and secure housing, gender children and indigenous rights	Optional protocol to the international Covenant on civil and political rights, 1975 Various articles of ICESCR Convention on the Elimination of All Forms of Discrimination Against Women, 1979 Article 14 states that ‘the State Parties will take into account the particular problems faced by the rural women...’

**Source:** World Bank 2008: Social Dimension on Climate Change: Workshop Report 2008, Social Development Department, World Bank; [www.worldbank.org/sdcc](http://www.worldbank.org/sdcc)

needs and special situations of the least developed countries in their actions with regard to funding and transfer of technology.”

## Addressing Climate Change: the Global Response

The publication of the First Assessment Report of the IPCC in 1990 on the state of the global climate had a potent effect on policy makers and on public opinion. It became the main basis for negotiations under the United Nations General Assembly on a climate change convention, which was launched in June 1992 at the Rio de Janeiro Earth Summit, where it was signed by 154 states. According to Article 2, the Convention’s ultimate objective is “to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic [originating in human activity] interference with the climate system”. The principles of the Convention are stipulated in Article 3, which also state that these principles inter alia shall guide the actions of Parties: “...States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth’s ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command” (UNFCCC 2006).

The Conference of the Parties (COP) to the Convention became the Convention’s ultimate authority and it held its 1<sup>st</sup> session (COP 1) in Berlin in 1995. Following the recommendations of the 2<sup>nd</sup> Assessment Report of the IPCC in 1996, the 3<sup>rd</sup> Conference of the Parties (COP 3) adopted the Kyoto Protocol in December 1997. The Kyoto Protocol sets individual, legally-binding targets for industrialised countries prepared to take positive steps to curb emissions of carbon dioxide and other GHGs from sources within their remit. The Protocol came into force in 2004 with the first commitment period from 2008 to 2012. Well ahead of the termination of the Kyoto Protocol, the 13<sup>th</sup> Conference of the Parties held in Bali, Indonesia in 2007 adopted the Bali Action Plan for two-track negotiations for reaching a legally binding agreement beyond Kyoto. Bali Action Plan created two separate ‘Ad-hoc Working Groups’ respectively for Kyoto Protocol (AWG-KP) and Long-term Cooperative Action (AWG-LCA) to run the negotiation process in the subsequent years leading to COP15. Negotiations are on-going for far more ambitious GHG emission cuts for the second commitment period of 2013-2017.

## The Recent Dynamics of Climate Change Negotiation: LDCs are in Crossfire between Developed and Developing Country Parties

Discussions of the 15<sup>th</sup> Conference of Parties (COP15) of the UNFCCC in Copenhagen, will mostly center on the formulation of a new statement of commitment that will replace the Kyoto Protocol beyond 2012. This will then form the basis for future commitments of all State Parties. The new commitments will have implications for both Annex 1 (Industrialised Countries) and Non-Annex (Developing and Least Developed) Countries, but countries are found negotiating in several major blocs.

During the COP negotiations, as in the intersessional meetings, the country parties are found negotiating through three major blocs i) the European Union, ii) the United States, supported by Japan and Canada, and iii) the G77 and China. In addition, there are also regional blocs also, such as the Africa Group, LDC Group, The Alliance of Small Island Developing States-AOSIS, Environmental Integrity Group, etc.

Among the negotiating blocs, the G77 and China is the major one, comprising 138 countries, which includes developing countries, LDCs, and the SIDS. The G77 and China is the platform of almost all the Non-Annex Country Parties who are historically not responsible for the present climate crisis. Therefore, in a broader sense, G77 and China is a distinctive negotiating bloc of common interest. But given the context of economic disparity especially in the GDP growth of the country Parties, G77 and China is a heterogeneous group mostly driven by the development interests of the advanced developing countries. Members of the Organization of Petrol Exporting Countries (OPEC) as well as other emerging developing countries whose emission levels are rapidly increasing also constitute the G77 and China. Both the developed and advanced developing nations therefore try to keep ways open for GHG emissions, although the consequences of delay in the process of reducing the emissions will result in more climatic catastrophes, social imbalances and massive economic collapse in the LDCs. Hence, the key advocacy agenda of the LDC group to push concerned country parties towards reducing their GHG emissions gets compromised or watered down by being in the same negotiating bloc of the G77 and China.

Ideally, the LDC Group should be a separate negotiating bloc in order to advance its interests of mitigation and adaptation. Moreover, the LDC Group being given a special treatment under the UNFCCC, provides the political basis and rationale for a special negotiating bloc in the climate change negotiations.

# Major Agenda for Discussion at COP 15

The Copenhagen Climate Talks will hold the final session of the AWG-LCA under the UNFCCC and the session of the Ad Hoc Working Group on Further Commitments for Annex-I Parties under the Kyoto Protocol (AWG-KP). The work in Copenhagen will focus the negotiating texts on the key elements of the Bali Action Plan (BAP), namely: adaptation, finance, technology, mitigation, capacity building and a shared vision for long-term cooperative action (ENB 2009). The Bali Roadmap, an agreement on a two-year process started from CoP13 held in 2007, which covers negotiation “tracks” under the Convention and the Protocol and sets a deadline for concluding the negotiations at COP15 and COP/MOP5 (Member of the Parties). Thus, the two key bodies under the Bali Roadmap are the AWG-LCA and the AWG-KP.

On the other hand, discussion under AWG-KP rounded on Annex I parties’ emission reductions beyond the first commitment period under the Kyoto Protocol. In addition, parties continued to discuss other issues in the AWG-KP’s work programme, including the flexibility mechanisms, and Reducing Emissions from Deforestation and Forest Degradation (REDD) in Developing Countries (REDD) plus, land use, land-use change and forestry (LULUCF) as well as potential consequences of response measures.

## Position on Mitigation

Stabilising GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, which is the ultimate objective of the Convention, can be achieved in two ways. The first is by limiting or, as appropriate, reducing anthropogenic GHG emissions by (?) sources and the second by preserving, or, as appropriate, enhancing sinks and reservoirs of GHGs. In relation to emission reduction, the Convention provides a strong foundation for an inclusive, fair and effective international climate change regime that effectively addresses the imperative to stabilize the climate system while recognising imperative and right of developing countries to develop, and address poverty and food security.

Article 3 of the Convention (referred to as the equity article) stipulates that: a) Parties should protect the climate system ‘on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities, and b) Developed countries should take the lead in combating the adverse effects. In relation to GHG limitation or reduction, the Annex-I Parties that are also Parties to the Protocol agreed to be legally bound by specific commitments on the reduction or limitation of GHG emissions – up to 5 per cent below the baseline levels of 1990 during the 2008-2012 period.

In framing the post Kyoto architecture, the BAP contains six sub-paragraphs on mitigation: of which discussion on 1(b)(i) and 1(b)(ii) created ‘deep divides’ between developed and developing country Parties. These are:

On mitigation by developed countries, paragraph 1(b)(i) of Bali Action Plan says measurable, reportable and verifiable nationally appropriate mitigation commitments or actions, including quantified emission limitation and reduction objectives, by all developed country Parties, while ensuring the comparability of efforts among them, taking into account differences in their national circumstances.

On the other hand, on mitigation by developing countries 1(b)(ii) calls for nationally appropriate measurable, reportable and verifiable mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity building,

However, in the recent climate talks it has been observed that the developed country Parties want creation of a separate sub-group to consider proposals relating to common elements of mitigation by all parties, which is inconsistent with the Convention as they would impose new requirements on developing countries. The intention of the developed countries to bring developing countries under ‘binding commitment’ on emission reduction and monitoring, reporting and verification system (MRVS) is in conflict with the Kyoto Protocol and also with the Equity Principle of the UNFCCC. The developed countries seem to be engaging in a concerted plan to reduce their own commitments while pushing their burden onto developing countries, which are asked to take on more than their fair share. Proposals on frameworks for mitigation action by all parties seek to erase the distinction between developed and developing countries and impose new mitigation and reporting commitments on the latter. G77 and China group opposes insertion of new sub-paragraphs in the mitigation text of BAP as this will disregard the distinction between mitigation by developed and developing countries both in magnitude and legal nature. Moreover, since the LDCs including the SIDS have the least significant GHG emissions, mitigation commitments by other country parties are a priority for LDCs and SIDS.

LDC Watch calls for:

- GHG emission reduction by developed countries by 45% by 2020 compared to 1990 level Emission reduction essentially shall in domestic level
- Keep temperature rise well below 1.5 degree Celsius
- GHG concentration below or at 350 ppm by 2100
- Allow GHG concentration peaking by 2015

# Position on Mitigation and Adaptation Finance

Although the strategies of addressing climate change e.g. mitigation, adaptation and support to existing development growth are interlinked, the latter two are particularly important and pose real challenge to the LDCs as they would require new, addition and incremental financial resources for implementation. In this regard, the Bali Action Plan refers to the need for “improved access to adequate, predictable and sustainable financial resources” and noted a provision of “new and additional resources” and “innovative means of funding to assist developing country Parties that are particularly vulnerable to the adverse impacts of climate change in meeting the cost of adaptation”.

Additionally, in the context of LDCs, the IPCC 2001 report describes the requirements for a high adaptive capacity as (i) a stable and prosperous economy (ii) a high degree of access to technology at all levels (iii) well-delineated roles and responsibilities for implementation of adaptation strategies (iv) systems for the national, regional and local dissemination of climate change and adaptation information and (v) an equitable distribution of access to resources. Clearly, LDCs do not meet these requirements and hence are in dire need of both financial and technical adaptive capacities. The special LDC Fund that was created in 2001 in Marrakesh to tackle the adaptation challenge needs to be therefore further replenished by new and additional funds.

The LDC Party demand for “new and additional” funds from developed countries, as well as for their “adequacy” and “predictability” – demands which are by no means new or invalid. It has also, for example, been articulated in Article 4.3 of the UNFCCC. Given the patterns of differentiated (historic) responsibilities, the costs for developing country adaptation are seen as debts to be borne by the still largely responsible industrialised world, and debts cannot be repaid by loans, or even by ‘grants’. Moreover, given this pattern of differentiated responsibilities, there are also strongly held views on the importance of an *equitable* distribution of the burden of such funding.

LDC Watch calls for:

- Mandatory contributions from Annex-I Parties for meeting the cost of adaptation, which should be supported primarily from ‘public sources’
- Financial resources should be over and above the existing 0.7% Overseas Development Assistance (ODA) commitment; the proposed financial resources should not be less than 1.5% of the GDP contribution by the Annex-I Parties and with increased allocation to the LDCs and SIDS;
- Adaptation fund must be provided on a grant basis (not as concessional loans);
- Finance should be sustainable and in line with sovereign ownership of the recipient countries, and should be free from the domination of the existing international financial architecture especially from the World Bank that has been lobbying for its role in steering the adaptation funds;
- The level of financing shall be adequate and predictable with direct, simplified and quicker access for the recipient countries, especially by the LDCs;
- Immigration rights of the climate change induced forced migrants to the Annex-I countries with ensuring their social, cultural and economic rights.

The adaptation financing should address different types of adaptation needs, such as: climate-proofing Official Development Assistance (ODA); climate-proofing of existing infrastructure; additional investments for new infrastructure; costs on community level /community based adaptation, capacity building; restoration of ecosystem services; addressing mass displacement; and; mainstreaming adaptation into development and poverty reduction national and international development plans and processes (Benito Muller, 2008). Thus, the measures and financing of climate change adaptation should not be integrated with the efforts and financing on poverty reduction. Although some of the measures of climate change adaptation comply some with measures of poverty reduction, many of the adaptation measures like restoration of eco-system services, efforts of disaster risk

## The Kyoto Basics

The 3rd Conference of the Parties of the UNFCCC held in Kyoto, Japan in December 1997 agreed to a Protocol that commits industrialised countries and countries in transition to a market economy to achieve emission reduction targets. By this, Protocol countries, known as Annex I parties under the UNFCCC, agreed to reduce their overall emissions of six greenhouse gases by an average of 5.2% below 1990 levels between 2008 and 2012 (the first commitment period). The Kyoto Protocol entered into force on 16 February 2005 and now has 189 parties. The Protocol provides commitment periods that set legally binding aggregate and individual targets for Annex I Parties to reduce greenhouse gas (GHG) emissions, and has a compliance system.

reduction (DRR) to address additional risk factors caused by climate change, rehabilitation of the displaced people, technology innovation for agriculture development in the changed climatic condition etc. would require additional financing.

It's also important to look into the quality of financing and its effectiveness as emphasised in the Paris Declaration. Financing should be sustainable, predictable and with the sense of local ownership. The adaptation financing should be largely and primarily from the public sources of the developed countries not much depending on 'market based solutions'.

## Position on Technology Transfer

Technology is a major element in addressing climate change in terms of the potential for existing and new technologies to play key roles in global and domestic climate change monitoring, mitigation and adaptation strategies and actions.

Although the issue of technology transfer has been discussed among the state Parties, the governmental context is that governments could basically transfer nothing. As per intellectual property rights (IPR), the technologies are owned by the private sector and therefore the governments could not transfer these. That is why trade ministers from different country Parties and representatives from the World Trade Organization (WTO) are increasingly taking part in the climate talks – to explore possible options of trading environment-friendly technologies developed by the Annex-I Country Parties.

In the Bali Climate Conference, the trade ministers and senior trade officials from 32 countries reached an agreement to intensify high level engagement on trade and climate change, and they have high hopes that the WTO will play a wider role in technology transfer. Supporting the inclusion of WTO in the trade game, the US trade representative said that the WTO, under the Doha Development Agenda (DDA), already gave a mandate for member countries to focus on negotiation on environmentally-friendly goods and services (Md. Shamsuddoha and Rezaul Karim Chowdhury 2008)

Here, the pertinent question is how is DDA benefiting the LDCs? On paper, it is a matter of hope for the LDCs, but in practice it is a matter of frustration as the WTO members have not yet fulfilled the commitments they made under DDA to allow duty-free and quota-free access to goods originating from the LDC's. Meantime, most of the LDCs have opened up their economies due to pressure of the international financial institutions (IFIs) e.g. the World Bank, IMF. For example, there are proposals at the WTO for removing the non-tariff barriers e.g. removal of higher taxes on cars with a higher engine capacity, or the

government actions to facilitate financing of consumers' purchase of motor cars, etc. which directly will contribute increasing carbon emissions.

Technology transfer to the developing countries should not just be about the opening up of the environmental goods and services market, but about enabling developing countries to access and procure these goods and services, and facilitate the ability of developing countries to use these technologies for emission reduction and to adapt to climate change. Thus the trade liberalization for goods and services that has been pushed by the WTO's multilateral trade mechanism would result in nothing unless a 'package of capacity building and facilitation' measure is included with the process of technology transfer.

LDC Watch calls for:

- LDCs should be provided with necessary financial assistance and technology cooperation in upgrading indigenous technologies through innovation, creating markets for relevant technologies with the right kind of investment and enabling environment;
- LDCs should be exempted from the obligations of patent protection of climate related technologies for adaptation and mitigation, as required for capacity building and development;
- Development of Climate Change Adaptation and Mitigation Technologies must be kept outside the present IPR regime;
- Annex I Parties should support innovative climate change research and technology development and make it freely available to the LDC country Parties.
- Patented technologies should be made available free of charge to the LDCs/SIDS;
- Genetic resources, that are essential for adaptation in agriculture, must not be patented by multinational or any other corporations. These should also not be considered as traded items under the IPR regime of WTO.

## Conclusion

A new international agreement is urgently needed to effectively address climate change and it must include ambitious and robust commitments for reducing emissions by developed countries, nationally appropriate mitigation actions by developing countries, financial assistance to the LDCs including the SIDS for adaptation actions, and appropriate technology cooperation as outlined in the Bali Action Plan. We urge the governments of the world's leading economies to materialize the 1.5 degrees Celsius goal. All country Parties should maximize

the opportunities Copenhagen offers for a strong and coherent climate deal to "recalibrate" the international response to climate change in line with the danger posed to human security and development.

For the 49 LDCs, in particular, the effects of climate change is exacerbating the challenge of poverty eradication and sustainable development and posing a survival issue especially for the SIDS within the LDC group. LDC Watch wants to reiterate that the LDCs have little or no contribution to the catastrophic GHG emissions and thus, only adaptation is the rightful action for the LDCs in terms of climate justice. The international development community should therefore pay back this enormous environmental debt to the LDCs and mobilize itself to committing stronger financial and technological support by integrating this issue of climate justice into the broader development agenda for the LDCs. Finally, integration does not mean substitution; new commitments in favour of climate justice should not jeopardize existing and essential investment into the socio-economic development of LDCs.

LDC Watch calls for upholding the spirit of rights and justice on behalf of those 785 million citizens living the most vulnerable and marginalised lives in the 49 LDCs – it is no longer an issue of the Right to Development, but the Right to Life. We demand climate justice. And we demand it now.

## References

ENB (Earth Negotiations Bulletin) (2009), IISD Reporting Services, Vol 12, No 439, International Institute for Sustainable Development, 12 October 2008, [www.iisd.ca/climate/ccwg7/](http://www.iisd.ca/climate/ccwg7/)

IPCC (Intergovernmental Panel on Climate Change) (2007) Climate Change 2007: Synthesis Report, Contribution of Working Groups I, II, III to the Fourth Assessment Report of the Intergovernmental Panel of Climate Change, IPCC, Geneva, Switzerland

Muller Benito. International Adaptation Finance: The Need for an Innovative and Strategic Approach; June 2008

Shamsuddoha Md and Rezaul Karim Chowdhury; Political Economy of UNFCCC Bali Climate Conference: A Roadmap to Climate Commercialization, DEVELOPMENT Journal Volume 51, Number 3 (September 2008) published by Palgrave Macmillan.

UNDP (United Nations Development Programme) 2007. Human Development Report 2007/2008. Fighting Climate Change: Human Solidarity in a Divided World. New York: UNDP.

UNFCCC; Uniting on Climate: A guide to the Climate Change Convention and Kyoto Protocol, 2007

UNFCCC: United Nations Framework Convention on Climate Change: Handbook. Climate Change Secretariat, 2006 ISBN: 92-9219-031-8

UN-OHRLLS 2009; The impact of Climate Change on the development prospects of the Least Developed Countries and Small Island Developing States

World Bank 2009. South Asia Climate Change Strategy 2009.

World Bank 2008: Social Dimension on Climate Change: Workshop Report 2008, Social Development Department, World Bank; [www.worldbank.org/sdcc](http://www.worldbank.org/sdcc)

# People's Testimonies

## on the Impacts of Climate Change in the LDCs



### BANGLADESH

## Geo-physical Features and Vulnerability to Climate Change

The geographic location and geo-morphological conditions of Bangladesh have made the country one of the places in the world that is most vulnerable to natural disasters. Bangladesh is situated at the interface of two different environments, with the Bay of Bengal to the south and the Himalayas to the north. This peculiar geography of Bangladesh causes not only life-giving monsoons but also the catastrophic ravages of natural disasters, to which now are added climate change and sea level rise. The country has a very low and flat topography, except the northeast and southeast regions. Around 10 percent of the country is hardly 1 meter above the mean sea level (MSL), and one-third is under tidal excursions.

Bangladesh ranks low on just about all measures of economic development. The low level of development, combined with other factors such as its geography and climate, makes the country more vulnerable than others to existing as well as to future disasters. This will be multiplied due to climate change. Having 147,570 sq-km land areas, Bangladesh is struggling to balance land usage for economic purposes such as agriculture and industrialisation on the one hand, and usage for non-economic purposes such as housing and urbanization, on the other. At present, around 80,000 ha of land areas is being eroded due to the latter. Population density is currently 926 sq-km and the annual population growth rate is 1.48 percent. The per capita income in Bangladesh is around US\$500. More than a third of the people still live in poverty – the majority of whom live in rural areas, risk prone locations and urban slums.

Around one quarter of the country's GDP comes from agriculture, which makes the country's economy sensitive to existing and impending disasters. Access to income and employment is limited, with a large service sector, a climate-sensitive agriculture sector and industry. Access to

drinking water is also insecure all year round in some parts of the country, due to saline intrusion in the coastal area, while a large part of the country's groundwater is contaminated with arsenic. So far, the country has demonstrated its will and effort to respond to national emergencies, particularly those with regard to natural hazards like flood, tornado, landslide, cyclone, storm surge, cold spell, etc. However, frequent and uncertain weather conditions and extremes have eroded the household and community safety nets. Local and national governments struggle to reallocate development resources or access external resources to help people and the economy recover.

Nonetheless, nature is harsh on Bangladesh. The country could be considered as nature's laboratory on disasters. The rivers swell with summer monsoons, filling Bangladesh's vast flood-plain and submerging a quarter to a third of the land in a typical year, and up to two thirds in the worst of years. Several cyclones usually tear through the heart of the country each year, drowning people in storm surges and ripping up trees and homes. Less sudden calamities – droughts in the country's few highland areas, erosion of the river banks and coastlines — also rob people of food and land. No country or people know this better than Bangladesh, where millions of people suffer from disasters each year. This is due to its unique geographical location, dominance of floodplains, low elevation from the sea, high population density, high levels of poverty, and overwhelming dependence on nature, its resources and services.

There are also indirect effects of disasters, such as the degradation of agricultural lands and the consequent decline in their productivity, income decline, loss of ecosystem services, loss of physical infrastructure etc. In this backdrop, the Fourth Assessment Report of IPCC (2007), recognised that the developing countries and the poorest people will suffer the most from climate change because of limited assets, and a greater dependence on climate-sensitive sources of income. Some of the impacts could be in the form of new challenges and others could emerge as old threats, made more severe by climate change. In the severe climate change scenario, sea level rise poses an existential threat that would inundate 18 percent of Bangladesh's total land, directly impacting 11 percent of the country's population. Salt water intrusion from sea level rise in low-lying agricultural plains, along with other hazards, could lead to 40 percent decrease in food grain production and would cause displacement of 30 people from their habitat.

According to IPCC in their recently published Fourth Assessment, the following changes have been observed in climate trends, variability and extreme events:

- In Bangladesh, average temperature has registered an increasing trend of about 1°C in May and 0.5°C in November during the 14 year period from 1985 to 1998;

- The annual mean rainfall exhibits increasing trends in Bangladesh. Decadal rain anomalies are above long term averages since 1960s;
- Serious and recurring floods have taken place in 2002, 2003, and 2004. Cyclones originating from the Bay of Bengal have been noted to decrease since 1970 but the intensity has increased;
- Frequency of monsoon depressions and cyclones formation in Bay of Bengal has increased;
- Water shortages have been attributed to rapid urbanization and industrialization, population growth and inefficient water use, which are aggravated by changing climate and its adverse impacts on demand, supply and water quality;
- Salt water from the Bay of Bengal is reported to have penetrated 100km or more inland along tributary channels during the dry season;
- The precipitation decline and droughts have resulted in the drying up of wetlands and severe degradation of ecosystems
- Increased vulnerability in the social position of women, children, elderly and disabled persons, who suffer more than other sections of the community.

This variability in climate, stated above, will affect several vital sectors that are major water users, including agriculture, domestic/municipal, fisheries, navigation and industry.<sup>1</sup> Climate change impacts result from the combined effects of higher tides, more penetrating storm surges, salt-water intrusion, erosion of land by the sea, and the congestion of river drainage that causes rivers to back up and flood. Likely effects of climate change in Bangladesh include: increased and/or more intense monsoon rainfall and decreased winter rainfall; increased vulnerability to irregular river flows due to the melting of Himalayan glaciers; more frequent and/or more severe cyclonic storms; and increased inundation and salt intrusion to surface and ground waters due to sea-level rise and drought. Added to these risks are the likely consequences of sea level rise, which may cause economic losses of an unprecedented magnitude in low-lying Bangladesh, where a 45 cm increase may result into 75 percent of Sundarban affected adversely.

The agriculture sector in Bangladesh that contributes 22 percent of the country's GDP and creates employment of 52 percent of the country's population will be affected severely by climate change. Untimely floods (tidal, flash, river) endanger harvests. Storms, cyclones, tidal waves endanger crop production. Climate change causes variation to the water regime including precipitation patterns in the country and water input from the catchments are projected to change significantly. A rise in temperature will decrease rice production around 16 percent, and wheat and potato production will also be reduced significantly. Further, changes in temperature,

humidity and radiation will have greater effects on the incidence of insect pests, diseases and microorganisms, which has a direct bearing on crop yield. Already food deficit in Bangladesh is again under risk of further exacerbating problems of food insecurity due to damage by disasters and gradual degradation of the production systems due to climate variability.

Water-related impacts of climate change will likely be the most critical concern for Bangladesh in terms of urgency, severity, and economic consequence. Bangladesh, a deltaic country drains water from a huge catchment area; around 92 percent of water that Bangladesh drains is from outside the country. It is likely that there shall be more water during monsoon and less water during dry season. There shall be more floods, droughts, water logging, drainage congestion, storm surges, salinity intrusion, and river bank erosion. Coastal zones shall be impacted due to salinity intrusions, cyclones, and storm surges. Offshore islands are particularly exposed to climate change impacts. Cyclone, salinity, storm surge burdening people's life and livelihood increasingly following climate change. Over 3 million people on 72 islands are not protected against storm surges or tidal waves.

Cross-boundary river flow being influenced by snowmelt variations in the Himalayas and other factors has direct bearing on the availability of upstream flow in the 54 rivers shared with India.

Freshwater availability is currently highly seasonal. Lower winter precipitation in combination with higher evaporation rates will lead to reduced availability of fresh water (for drinking, agriculture, industrial uses) in the drier months. Moreover, reduced winter flows may make surface water systems more vulnerable to increased saline water intrusion, and also exacerbate contamination from industrial and municipal effluents. Water borne and vector borne diseases will increase. Child health, maternal health and mortalities may increase, and it is predicted that Cholera, dengue, diarrhea and malaria will increase.

Among the natural forest ecosystems, the Sundarbans mangrove forest is likely to be severely affected by climate change. High evapo-transpiration and low-flow in the winter are likely to increase soil salinity. As a result, the growth of freshwater species would be severely affected. Over time, the species offering dense canopy cover would be replaced by non-woody shrubs and bushes, and the overall forest productivity will decline significantly. The degradation of forest quality might cause a gradual depletion of rich diversity of the forest flora and fauna of the Sundarbans ecosystem.

The impacts of climate change are very high and widespread across all sectors and all levels. The poorer section and marginalised community will be most affected. Climate change and variability threatens achievement of the Bangladesh Poverty Reduction Strategy (PRS).

## Measures in Place to Battle Climate Change Impacts

The unprecedented impacts of climate change are becoming development challenges to the country's quest for growth and development; this situation is therefore preventing achievement of the Millennium Development Goals (MDGs). The goals of eradicating poverty, combating communicable diseases, and ensuring environmental sustainability are already in jeopardy. Major incidents that affect achievement of the poverty reduction strategies and MDGs are: (i) inundation or submersion of low-lying coastal areas due to sea level rise and displacement of huge population; (ii) incremental cost for disaster risk reduction and financial loss due to increased level of disasters; (iii) intrusion of salinity and thereby scarcity of drinking water; (iv) reduction in crop production which is around up to 30 percent, and; (v) increasing health hazards.

Considering all of these, and as a response to the decision of the Seventh Session of the Conference of the Parties (COP 7) of the United Nations Framework Convention on Climate Change, the Government of Bangladesh prepared its National Adaptation Programme of Action (NAPA) in 2005. The NAPA focuses attention on three impacts associated with climate change: increasing sea-level rise, changing rainfall patterns, and increases in the frequency and intensity of extreme events. The NAPA suggested 15 projects for 'immediate and urgent implementation', stating that 'delay in implementation would increase vulnerability and/or would increase adaptation costs later. Meantime, the Government of Bangladesh examined its vulnerability to climatic change, as part of the NAPA process, and as part of the core business of related governmental and scientific institutions.

In line with this, very recently the Government of Bangladesh formulated a Climate Change Strategy and Action Plan (CCSAP) and identified a number of projects under six main pillars: food security, social safety and health, comprehensive disaster management, infrastructure, research and knowledge management, mitigation and low carbon development, and capacity building. In 2009-10, the government allocated around USD 100 million for undertaking climate change adaptation measures. This financial contribution is very small in relation to the approximately 5 billion USD that the country needs a year for climate change adaptation.

The Government of Bangladesh has also taken several measures for forest conservation and afforestation in the new areas. The official forest coverage of Bangladesh is around 17 percent, which must be considered against 25 percent, the general standard that a country should maintain. Realising the alarming situation of low forest coverage, the government has set a goal to increase the forest coverage to 25 percent by 2015. The government has undertaken a massive project of 'social afforestation' which will cover nearly 1 million acres of land. Bangladesh

## Climate Change Impacts and Debt Entrap in Bangladesh

The geographical distribution, frequency and intensity of climatic hazards are already being altered significantly by climate change. UN-ISDR estimates nine out of every ten disasters are climate-related. In Bangladesh, increasing trends of disasters have been observed, which have clear link with the climate change. These disasters are causing huge financial loss to the country and impeding country's economic growth. In 2007 Bangladesh faced two devastating disasters; consecutive monsoon floods in July and category 4 super cyclone, Cyclone Sidr, in November. Monsoon floods in June and August 2007 caused extensive agricultural production losses and destruction of physical losses, totaling near 1.1 billion USD. And the cyclone Sidr in November 2007 caused 3500 death of people along with extensive damage of resources totaling \$ 1.7 billion; roughly 2.8 percent of gross domestic product (GDP). There are also indirect effects of disasters, such as the degradation of agricultural lands and the consequent decline in their productivity, income erosion, loss of eco-system services, loss of physical infrastructure etc.

The occurrence of these events in close succession is a reminder of the country's extreme vulnerability to frequent hydro-metrological hazards, which stand to be further exacerbated because of climate change. The impacts of climate change (e.g. loss and damage of resulting from frequent and intense disasters caused by climate change) are causing billion dollars of economic loss annually, which again making the country more indebted to the IFIs. In Bangladesh, meantime, the increasing nature of debt servicing liabilities (which is around 20 percent of revenue expenditure during 2009) has become a concern as it is already surpassed our health and education budget.

has large designated forest areas devoid of crown cover or only having shrubs and the government is seeking more financial assistance to increase forest coverage and conservation of existing forest.

Aside with the increase of forest coverage, the Government of Bangladesh is also planning extensive institutional reform and capacity building to establish forest governance. There appears to be long-term commitment and political will to develop institutional and human capacity, as well as towards elimination of corruption for sustainable forest resource development.

### Conclusion

Climate change is the major manifestation of global environmental change resulting from our pattern of socio-economic development, which is damaging natural environmental and ecosystems. The upwards trend in disaster risk – primarily due to increasing numbers of poor people living in vulnerable conditions – has also been identified as a consequence of inappropriate socio-economic development patterns. The centrality of sustainable development and the associated need to transition towards more sustainable patterns of production and consumption (away from consumption-based growth) including appropriate lifestyles changes has been

acknowledged in the climate convention's shared vision for long term cooperative actions.

Sustainable development and socio-economic transformation is fundamental to the maintenance and restoration of healthy ecosystems on which the security of millions of people depend. However, within the draft climate convention, sustainable development does not appear as a cross-cutting issue for adaptation and mitigation actions in both developing and developed countries. Whilst adaptation has been broadly interpreted to include a wide spectrum of development issues (e.g. sustainable livelihoods, agriculture development, food security, integrated water resource management, public health services, etc) these activities are primarily seen as activities implemented in "developing" countries.

In the context of the "developed – developing country" relationship, adjusting growth patterns towards more sustainable patterns is not something that can be addressed by developing countries alone. Most fundamentally, it requires a change in the consumption-based growth patterns as led by the rich countries, which lie at the root of the degradation of the earth's ecosystems and increase in social vulnerability. Therefore, in all development actions, irrespective of developed and developing countries, the issues of environment and sustainable development should be integrated.



million hectares of the agricultural land, and depends mainly on rainfall. 85 percent of the country's rice field is rain-fed. About 20 percent of farmers are landless and 35 percent have cultivated land less than 0.5ha per household (Pel et al, 2006). The average rice yield is 2.26 ton/ha in wet season and 3.1 ton/ha in dry season, which is very low compared to averages from Cambodia's neighboring countries.

The country naturally experiences an annual "dry season" from November to April, which does not constitute drought; and "wet season" from May to October (with monsoon break of about 15-30 days between July-August) typically causes the inundation of large tracts of land in the floodplain areas – an important process that assists in maintaining biodiversity, fish stocks and soil fertility. The average temperature normally ranges from 22-28°C in the rainy season to a maximum of 38°C in the dry season. There is no publicised data regarding temperature increase but a recent study on people's perceptions on climate change shows significant increase in temperature in the past two years<sup>2</sup>. This corresponds to the Meteorology Department of Prey Veng province that reported that average temperature in the province has increased about 0.2°C during 2007-2008. However, though this increased temperature causes discomfort in working and living, there has not yet been a proven significant negative effect on people's health. However, rapid changes in temperature in short periods of time are reported to be associated with cough and fever. The average annual rainfall varies from 1,000 to 3,400mm during 1994-2004 (high in mountain area and low in the central plains).

According to projections conducted by Cambodia's Ministry of Environment, the frequency and intensity of floods would increase with changing climate patterns, the annual rainfall would increase between 3 and 35 percent from the current condition and low land areas seem to be

more affected than upland areas. The temperatures in Cambodia would increase by 0.3-1°C by 2050 and up to 1.35-2.5°C by 2100. These result in the increased occurrence of extreme climate events. In addition, the sea level rise may affect the 435 km long coastline, large parts of the Mekong River floodplain areas and Tonle Sap Lake ecosystem. A one-meter sea level rise would submerge a total area of approximately 44km<sup>2</sup> of the low-lying coastal city of Koh Kong.

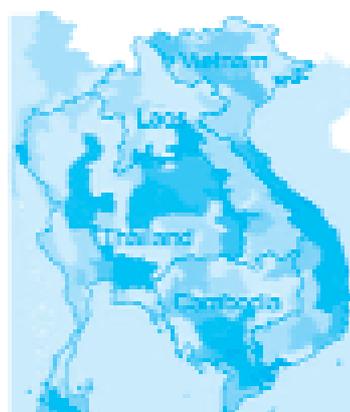
A study by the Economy and Environment Program for Southeast Asia states that four provinces (Preah Vihear, Kompong Speu, Mondolkiri and Ratanakiri) are among the most top ten vulnerable regions in Southeast Asia (see maps below).

Changing weather patterns negatively affect rural livelihoods in Cambodia, where the majority of the population depend mainly on agriculture and natural resources. Drought and flood are found the most severe climate hazards in Cambodia, followed by windstorm. Uncertainty of precipitation also is recorded. Drought has occurred with an increase in frequency and intensity, and rain fall has changed in distribution pattern, timescale and intensity. Although there is limited reliable data on climate records in Cambodia, recent studies and observations revealed that there is an increase in temperature, change in rainfall pattern and rise in sea level. For instance, in 2009, the monsoon break has extended for more than two months which dried up large amounts of rice seedlings and early season rice paddy. In the same year, early rainfall which started since March caused decreased or in many cases, loss of yield of rice – an important cash crop

In coastal zones such as Sihanuk province, sea level has risen 0.2m from the previous level during 2008-2009 – a first in recorded history. In November 2009, the sea level rise submerged more than 100 ha of rice paddy in Prey Nup district (RKa, 2009).



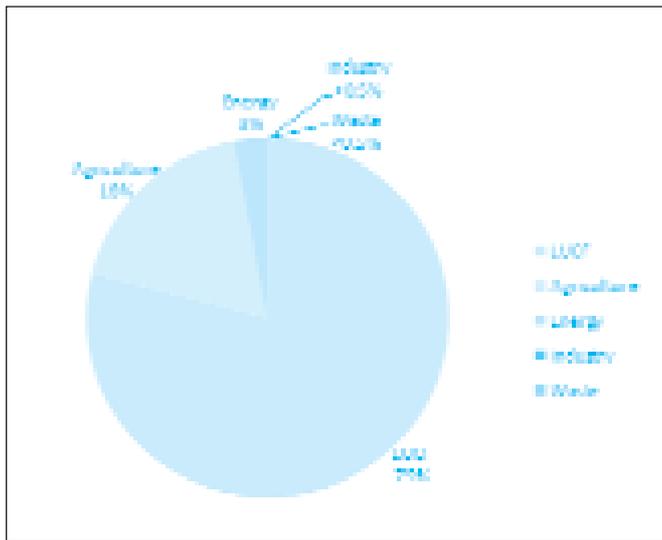
**Legend**  
 Country Boundary  
 Annual Cyclone Frequency  
 High : 0.001  
 Low : 0.0008



**Legend**  
 Country Boundary  
 Annual Flood Frequency  
 High : 0.702  
 Low : 0.005



**Legend**  
 Country Boundary  
 Annual Drought Frequency  
 High : 0.00001  
 Low : 0.00000



Cambodia's greenhouse gas (GHG) emissions are relatively low compared to other countries. This chart indicates Cambodia's GHG emissions profile by sector, including Land Use Land Use Change and Forestry (LULUCF) which was the largest emitter of GHGs in Cambodia in 1994. The government reports indicate that Cambodia emitted 6.2 million tonnes CO<sub>2</sub> by 2000, while other countries in Asia like Thailand emitted 286 million tonnes CO<sub>2</sub> and China emitted 3,650 million tonnes CO<sub>2</sub> in 1994 (Kim, 2009). It has been projected that the Cambodia's total GHG emissions would increase by more than 14 percent from 2000 to 2020, reaching nearly 44 million tonnes CO<sub>2</sub>.

## Impacts of Climate Change: Peoples' Testimonies

Storms were widely regarded as increasing in strength and frequency and some isolated incidents involving particularly severe damage to houses and trees (for example, a storm in Kampong Trabek district, Prey Veng, damaged 17 houses this year). The increase in thunder/lightning and the associated danger is a big concern, given that it has killed a hundred people in recent years. Typhoon Ketsana in 2009 was the worst storm event to hit Cambodia in its history, resulting in more than 20 deaths and 50 injured, destroyed hundreds of homes and caused damage to an estimated 30,000 hectares of rice paddy (Oxfam, Oct 2009).

Vector-borne diseases such as malaria cases were reported at 476 per 100,000 people in 2001, (some 800 deaths per year), the highest fatality rate from malaria in Asia (CNM, 2003). However, the number of malaria-related deaths generally declined since the late 1990s to 2008 due to the introduction of improved drugs and health facilities. However, in 2009, evidence emerged that the number of cases and the mortality rate from these cases has started increasing<sup>3</sup>. The link between this and climate has not yet been investigated, and this must be done; however, this is line with findings from other countries.

During 1987-2007, the National Committee of Disaster Management reported 12 floods which killed 1,125 people (most of them are children) and caused damages to infrastructure, property and crops. The total estimated damage was over US\$300 million. Floods in 2000 were the worst to hit Cambodia in 70 years, followed by similar floods in 2001 and 2002. During the same period, five droughts caused damages of more than US\$140 million. While production losses from floods and droughts have been connected with El Nino and La Nina (ENSO) events (in 1996, 1997 and 1998 especially), flooding and drought episodes in the past 10 years that are not associated with ENSO events have also destroyed crops at certain times and endangered food security.<sup>4</sup> For example, the 2002 flood affected 45,003 ha of rice and created food shortages for 477,472 people and a drought during the same year damaged 62,702 ha of rice, causing food shortages among 154,069 families. It was observed that there were no severe floods from the Mekong River from 2004 until 2008. However, in October 2009, floods and heavy rainfall caused by Typhoon Ketsana affected thousands of people who have fallen into poverty and are still facing alarming food shortages.

## Drought: A New Threat to the Agricultural Productivity

Mr Om Venn, of Kork Dangkor village in Kampong Seu, said he has been dealing with the impacts of frequent and prolonged drought since around 2003. He said that drought has caused failure during seedling transplantation, increased pest populations, depleted soil quality and decreased rice yield. His rice yield decreased from around 1020kg/0.5ha in 2003, to 75kg/0.5ha in 2004-2005 and he had to borrow money from other villagers to buy rice for consumption. To improve the production, he has used more chemical fertiliser. In 2005, he started planting corn in his homestead area in order to address the lack of food and to generate some more income. He also started cutting firewood in the mountains to supplement the family's income. To manage water shortage for rice paddy, his family started pumping water from a pond to irrigate his rice field since 2005; however, there is insufficient water to provide for all his fields.

Om noted some future plans to increase the water available for agriculture but acknowledged that the main barriers to rehabilitating water storage infrastructure in the community include reliance on the cooperation of all villages, which would involve huge cost.

## Change in Rainfall Pattern Causing Crop Loss

Ms. So Sophal, 36, a farmer in Kandal province. Her family has 1.5ha of rice field that can produce about 3,000 kg a year (single cropping). She has planted water melon on her 0.4ha rice field since 1994, from which she earns around 50,000-60,000 riel each year. But between 2008 and 2009, the water melon could not yield because of too much rain water during the time of the plant flowering and bearing the fruit which caused the spoilage of its fruits. She said that her family could save money as much as before for coping with any difficult circumstances particularly health treatment.

She had planted water melon from April to June before rice growing but during these years, the rainfall came unseasonably. Learning from the past failure experience in these two years, she noted to reschedule the planing time and may start from March-April.

The combination of high poverty levels and a high dependency on agriculture has made the country extremely vulnerable to climatic events. As a coping strategy with the shock, some of the affected families have migrated temporarily or permanently to find job in the city, nearby towns and Cambodia-Thailand border; while the others have tried to diversify their income generation activities and invest more in irrigation systems (digging well, buying pumping machine etc). In addition, numerous cases showed that many women and girls are engaged in intense family recovery efforts since the migration for work by men, sons and/or daughters.

## Measures in Place to Battle Climate Change

In 1995, the Cambodian government ratified the UNFCCC and acceded to the Kyoto protocol in 2002. As a signatory to the UNFCCC, and as a non-Annex I country, in 2002 Cambodia submitted to the UNFCCC its first National Communication report which examined the country's vulnerability to climate; the second National Communication report is expected to be completed in 2010 and will focus on Cambodia's emissions. The country has also adopted a National Adaptation Programme of Action to Climate Change (NAPA), which was endorsed by the Council of Ministers in October 2006 and aims to develop a realistic and achievable country-driven programme of action and priority activities addressing the adverse effects of climate change. Cambodia's NAPA identifies 39 priority adaptation projects in different fields and sectors. However, only few of these identified projects have been operationalised due to a number of barriers including limited funds available and limited awareness of climate change issues. With support from various donors, Cambodia has implemented a number of projects to address climate hazards: for the period of 1995-2003, Cambodia implemented 98 projects to address institutional strengthening, infrastructure development, and human resource development with a total value of approximately US\$ 328 million with funding support mainly from UNDP, GEF, LDC Fund etc. The MoE was appointed Cambodia's Interim Designated National

Authority (DNA) to facilitate the CDM project and the Cambodian Climate Change Office (CCCO) was established under MoE to serve as the Secretariat of the DNA and the country climate change focal point. In addition, the National Poverty Reduction Plan set the objective of improving the lives and livelihoods of the rural poor a top priority through improving agriculture productivity and rural infrastructures including water resource management particularly the irrigation projects.

However, the analysis shows that current national policies and programmes do not integrate global policies on climate change, focusing mainly on post-disaster emergency relief. The long-term programmes on research and education and for improving community capacity and enhancing community-based initiatives to cope with climate hazards and adapt to climate variability have not been developed and receives little attention in Cambodia.

A group of NGOs recently created National Cambodian Climate Change Network to develop capacity among stakeholders. The network began in July 2009 led by Danish Church Aid and Oxfam, and currently has more than 20 organization members. In Cambodia, the European Commission has supported the government and its development partners to implement Natural Disaster Preparedness Program (DIPECHO) and will support the "Cambodia Climate Change Alliance" together with other funding agencies and contribute Euro 2.2 million. In addition, the World Bank and Asia Development Bank have selected Cambodia to implement their Pilot Program for Climate Resilience, with a grant of more than US\$ 30 million.

## Conclusion

As in many other LDCs, climate change is a new concept for the Cambodian people, and awareness among the public is very low. The country economic still largely depends on agriculture, and therefore Cambodia has to move quickly forward to adapt to the changes of global warming rather than implement mitigation plans. Civil society has a key role and responsibility to push for change and to be a strong voice in setting the agenda through information exchange, awareness raising, advocacy and

capacity building to address climate change issues. There are some key recommendations:

- Increase public awareness including the awareness of local authorities on climate change issues; this would help in mainstreaming adaptation into national development.
- More capacity building on climate change issues, impact management and adaptation involving CSOs, GOs, local authority and community is needed.
- Sustainable agriculture and community-based water resource management is identified as the key climate change adaptation strategy to improve rural livelihood; while the same time conserving ecosystems in Cambodia.
- Advocacy to policy makers at national level and international level should be paid attention in order to support and encourage indigenous knowledge and local innovation development on climate change adaptation (e.g. community participatory seed breeding).

## References

Cambodian Governmental Declaration: Statement by His Excellency Mr. HOR Namhong, Minister of Foreign Affairs and International Cooperation of the

Kingdom of Cambodia, New York, 26 September 2009.

Ministry of Environment (MoE): National Adaptation Programme of Action to Climate Change (NAPA), Phnom Penh, Cambodia, 2006.

NAPA Team: Vulnerability and Adaptation to Climate Hazards and to Climate Change: A Survey of Rural Cambodian Households, Ministry of Environment, Phnom Penh, 2005.

National Institute of Statistics (NIS): Population Consensus 2008, Phnom Penh, 2008.  
<http://www.wpro.who.int/sites/mvp/epidemiology/malaria>

The World Factbook, April 2007

Kent Helmers and Sanny Jegillos: Linkage between flood and drought disasters and Cambodian rural livelihoods and food security, DiPECHO, 2004.

Kim Kimberley BUSS et al: Public perceptions of climate change in Cambodia, GERES Cambodia, 2009.

Pel Sokha et al: Review the Existing Sectoral Policies, Strategies Related to Wetlands: Agriculture, Land Use & Irrigation, CEDAC, Phnom Penh, 2006.

RKa: Rasmey Kampuchea newspaper on 03 Oct 09 and on 18 Nov 2009

Tin Punlok: Presentation paper in the EC climate change repercussions in rural Cambodia workshop, Phnom Penh, 19 November 2009.

## Geo-physical Features and Vulnerability to Climate Change

Ethiopia is a land of great contrasts. With a total area of 1.1 million km<sup>2</sup> and a population of over 74 million (CSA 2008), it is the second most populous country in Sub-Saharan Africa. With very weak economic bases and fragile agro-climatic conditions, it is among the bottom of the world's LDCs. Its per capita income of US\$ 164 is only a fifth of the sub-Saharan African average and its reliance on agriculture among the highest in the group, at 22.1 percent of the country's GDP, and a population that is 84 percent rural.

In the Human Development Index, Ethiopia's rank is 170th out of 177 countries, and 99th out of 103 developing countries in the Human Poverty Index (UNDP, 2007/08). Poverty is deep, widespread and unequal. About two-thirds of the population earns less than US\$ 2 a day. 5-6 million people are chronically food insecure and food insecurity affects as many as 15 million Ethiopians (MoFED 2006; MEDaC 1999). Recent government reports showed substantial reductions in national poverty levels. For instance, the 2005 national poverty head count index is lower than the index for 2000 by 12 percent, while the food poverty index fell from 42 percent in 2000 to 38 percent in 2005 (MoFED 2006). Global debt relief initiatives have also substantially reduced the country's external debt stock to around USD 3 billion. Foreign aid contributes 26 percent to the national budget of the country (CSA, 2008).

Once known for its wealth of natural resources and biodiversity, five thousand years of poor land and environmental management records and demographic and settlement expansion have degraded the natural environment of Ethiopia (Shibru and Kifle, 1998). Although

the actual rate of forest destruction and soil erosion are debatable (annual loss of natural forest cover is estimated in the range of 150,000 to 200,000 hectares while soil loss is estimated at 1 billion cubic meters per annum), most agree that both are occurring on a massive scale. Soil erosion is believed to affect 82 percent of the country; the high forest now covers only 2.4 percent of the country, down from an initial estimate of 40 percent.

The current government instituted the environmental rights of citizens in its Federal Constitution, ratified a number of international conventions (including the UNCCD, UNCBD, and UNFCCC), enacted a National Environmental Policy in 1997 and formulated a number of environmentally-oriented policies and programs. Unfortunately, most environmental policies and programmes have hardly been operationalised.

## Peoples' Testimonies on the Impacts of Climate Change

Ethiopia is especially vulnerable to climate change because of its geographic exposure, high incidence of poverty and social inequality, inadequate financial and technological resources, and greater reliance on poorly performing and climate sensitive socio-economic sectors such as agriculture, pastoralism and biomass energy. Presently, the national average precipitation is 2.4mm per day, but simulations suggest that the average daily rainfall amount will fall and lie around 1.97mm during the period 2070-2099 (Cline 2007). Decreases in rainfall amount will be exacerbated by high evapo-transpiration rates associated with the increasing temperatures and aridity. On the other hand, the average annual temperature is projected to rise from 23.8°C during 1961-1990 to 26.92°C during 2070-2099. According to the country's first national communications to the UNFCCC, temperature across the country could rise by 0.5-3.6°C by 2070.

According to the aggregate social vulnerability index developed by the Tyndal Centre for Climate Change

### Burning Sun and Changing Winds' as Sura Waqqo Feels

Sura Waqqo, aged 52, is an agro-pastoralist in Wachilie village, Arero district in Borana zone in southern Ethiopia. He associates the warming atmospheric conditions, the sharply falling and irregular rainfalls and the drought that has been recurring for the last 30 years in his locality with God's wrath. Sura complains that "despite our longings no rain is coming to our villages. Because of the drought, our land is unable to support our cattle. Our cattle are dying from under-nutrition and unidentified diseases. God is unhappy with us and that is why we do not get rain on time... We have only drought, hunger and livestock death." He is angered and puzzled by the situation.

When asked to explain what climate change means to him, Sura's response was straight forward, "it is drought and disease caused by the lack of God's rain and the change in the wind system". He goes on to say that "the wind and burning sun are bringing diseases and illness to our children and cattle. Our trees, which are the sources of our food, medicine and shelter, are dying and toxic weeds and thorny bushes are rapidly invading our grazing areas... The change is very serious nowadays. If it were not for relief rations (water and fodder from government and local NGOs) many cattle and children would have died".

Research, Ethiopia is the 7th most vulnerable country to the impacts of climate change in Africa (Vincent, 2004)<sup>6</sup>. According to IPCC's (2007) regional review and the Ethiopian NAPA, the country may face many of the impacts of climate change in the form of droughts, floods, strong winds and heat waves (high temperatures), frost, pests and diseases affecting the wealth and health of the people and the natural ecological systems. Generally, there is wide consensus that climate change will worsen the food security problem in the country, mainly through increased extremes and temporal and spatial shifts (NMA, 2001, 2007; Aklilu and Alebachew 2009). Even without the effects of climate change, weather variability threatens the livelihoods of millions of small farmers and herders in the country. Over the last two decades the frequency of droughts and floods has increased in many areas (Campbell, 1999), and since 1980, at least five major national droughts and dozens of localised droughts were recorded (NMA 2007). These drought shocks are a major cause of chronic and transient poverty. The official estimates are that climate change will reduce wheat yields by 33 percent (NMA 2001).

In addition, major flood hazards which hit the country consecutively in 1988, 1993, 1994, 1995, 1996 and 2006

inflicted heavy loss of life and property (NMA, 2007). In particular, the tragic flood in 2006 led to the loss of 700 human lives, drowning of 3600 cattle and the displacement of 35,000 people in Dire Dawa, South Omo and West Shewa (NMA, 2006). About 200,000 people were critically affected by the flood (DPPA). Spread of Acute Watery Diarrhea (AWD), cholera, acute respiratory infections and malaria outbreaks have caused widespread illness and many more deaths. In terms of malaria outbreaks, climate change is projected to cause encroachment of the disease from lower altitudes in Somalia and Afar regions to higher altitudes in Tigray and Amhara (NMA 2007). In 1990, the total population at risk of endemic malaria in areas where the climate is more than 75 percent suitable for malaria was 6.5 million. From 2000-2005, about 50, 000 people died from climate change-induced malaria (McMichael, 2006).

On the other hand, climate change is expected to worsen the problem of environmental degradation (NMA, 2001). Simulations by NMA show that with a temperature rise of 2.4°C - 3°C and a 5percent decline in precipitation, the spatial coverage of subtropical dry forests and subtropical moist zone will decline by 21-24percent and 4percent, respectively. On the other hand, models predicted an

## Farmers Mulualem and Wubalem: "From Insecurity to Hell and Death Valley"

Mulualem Berhane, 52, and his wife Wubalem Mengist, 38, are model farmers from the small rural town of Dembecha in the Amhara Region of Ethiopia. When asked to define climate change in their own terms, Mulualem and Wubalem simply give a pragmatic definition "It is an environmental and economic challenge and a threat to food security and human dignity". Wubalem says "because of climate change, we are experiencing rising temperature and very little and spatially uneven rainfall" and "as a result of the unpredictable and changing rainfall, we no longer produce the traditional sorghum and pumpkin crops. Some 20 years back, we had rain continuously. There was no drought. Our land was fertile and the region had a surplus of food. The cattle were fat and we also got large amounts of milk and butter. We had ample water supplies in our own village. There were more than 40 springs around Dembecha ... But these days nature has changed its face. I believe the main reasons are destruction of forests and changes in the patterns of temperature and the rains."

According to Mulualem, in Denbecha, drought is characterised by late start and early cessation of the main rains. "As the land continues to get barren and dry, production is falling and pasture is lacking. Because of illness and underfeeding, our cattle became small, weak and physically unattractive...In the past our cows used to give birth to calves frequently. Now they stay two or three years without giving birth to calves. Sometimes cows remain unproductive for about three or five years. Even if cows give birth to calves, the quality and quantity of milk yield is too low. Mulualem has the opinion that these changes are due to "inappropriate technology and our mishandling of nature."

Mulualem says "Previously we never experienced malaria. It was unknown. Now it is common and rampant everywhere. .. In 2008, the people of Arabi village near Gulla River were wiped out by malaria epidemics. The number of people who died from the epidemic was so high that it was not possible to practice the traditional burial ceremony for the dead. Unusually, donkey-driven carts were employed to take the dead to the burial sites... The perennial Gola River dried up... Because of the flood-induced landslide, a long rift was created between Kobiet village and the town of Denbecha... Because of drought and insecurity, people are resorting to begging, prostitution and migration to the cities. But hell is the city, which are the sources of insecurity, misery and death. As a desperate attempt to get out of the deadlock, the people in Dembecha were all praying in the church last year (2008). People were fasting, praying day and night for the rain to come."

## Unrelenting of Droughts, Water Trauma and Diseases in Arero District

Dureti Fejjo is a young agro-pastoralist (aged 31) from Arero district in Borena Zone of the Oromia Regional State in southern Ethiopia. She is married with 5 children (2 boys and 3 daughters). None of her children attend school. Duretie's husband is an old man (aged 64) who passes most of his time in the tribal council managing community affairs with the village elders. According to Duretie, the people in her village are living under difficult circumstances. She says "We are facing the stress from repeated and prolonged droughts and acute water shortages. Cattle are sufficient for a good life but water and grass are totally essential. Years ago, our grandparents had a very prosperous life and before that for generations, life was great. The rain was sufficient, the water wells full and tall grass abundant... The change is very serious nowadays. Rainfall has been continuously decreasing and our water sources dwindling. With the long absence of rain, pastures also failed and the animals died of fatigue and weakness..."

Duretie appeared disillusioned by the drought and the stress from water scarcity. She bitterly complained that "Livestock and water are extremely vital for our way of life. But the droughts in the past few years have become unusually prolonged, aggravating the problem of water and pasture shortages. ...Long ago, we used to have plenty of milk and butter to feed the family. But our cattle are weak and emaciated now. They don't give us adequate milk... Unidentified diseases are attacking and killing our herds and eroding our assets... In the past 5 years, we lost 12 cattle, 4 sheep and a goat from unidentified diseases... Our traditional healers failed to treat our cattle. What is worse, last year (in November 2008) our maize crops failed because of lack of rain... I don't know what to say or what to do."

expanded coverage of semi-arid and arid forests replacing subtropical high forests. Similarly, regional and local survey results reported bush encroachment (invasion of toxic weeds and thorny bushes) as a threat to indigenous tree and grass species ((MoFED 2006; Coppock 1994; Gemedo Dalle 2004; Aklilu and Alebachew, 2009). On the other hand there is justified fear that intensified change in climate may force some animal species to migrate. One estimate is that up to 75 percent of Ethiopian species could migrate out of the country (Nkomo et al, 2006; see also Hillman, 1991, 1992). In addition, since the climate crisis is regional, affecting neighboring Kenya, Somalia, Djibouti, and Eritrea, the feeling of insecurity and the potential risk of conflict, both internal and cross-border, and accompanying population movements are also great.

## Measures in Place to Battle Climate Change

Ethiopia has ratified the UNFCCC and its related legal instrument, the Kyoto Protocol, and submitted its initial national communication in 2001, and NAPA in 2006, to the UNFCCC. A high level National Climate Forum was established in 2008 and recently the Ethiopian Prime Minister was elected to lead the African group for climate negotiation in Copenhagen (COP 15). On the other hand, there are various national policy initiatives and sectoral programs which may address climate change, albeit indirectly. However, the country has not yet developed specific climate change policy. The effective implementation of existing environmentally-oriented policies and programs is also severely constrained by lack of capacity, poor coordination and oversight of long-term

environmental impacts of short-term economic benefits.

Ethiopia has not yet received support from the Global Environment Facility's Clean Development Mechanism packages or any of the international financial mechanisms for adaptation support. However, the Ethiopian civil society is doing commendable work in pushing the climate agenda nationally and lobbying for solidarity and climate justice at the international front. One such example is the organi of a successful campaign and submission of an appeal "African Climate Appeal" to the African Union.<sup>7</sup> In 2008, more than 50 environmental and development CSOs/NGOs formed a united network, the Ethiopian Civil Society Network on Climate Change, which is now proactively engaged in international climate negotiations (as observers) and in research, awareness raising, capacity building and the implementation of adaptation and mitigation projects.

## References

- Aklilu A. and Alebachew A. 2009. Assessment of climate change-induced hazards, impacts and responses in the southern lowlands of Ethiopia. Forum for Social Studies, Addis Ababa.
- Campbell D. J. 1999. Response to drought among farmers and herders in southern Kajiado District, Kenya: a comparison of 1972–1976 and 1994–1995. *Human Ecology* 27:377–415
- Cline, W. 2007. Global warming and agriculture: Impact estimates by country (Washington: Center for Global Development and Peterson Institute for International Economics). Rosenzweig,

- Coppock, D. L. 1994. The Borana plateau of southern Ethiopia: Synthesis of pastoral research, development and changes 1980-1990. International Livestock Center for Africa, Addis Ababa, Ethiopia.
- CSA. 2008. Summary and statistical report of the 2007 population and housing census. Addis Ababa, Ethiopia.
- EPA. 2003. State of environment report for Ethiopia. Addis Ababa, Ethiopia.
- Gemedo-Dalle T. 2004. Vegetation ecology, rangeland condition and forage resources Evaluation in the Borana lowlands, southern Oromia, Ethiopia. Georg-August-University: Gottingen.
- Hillman, J. 1991. The current situation in Ethiopia's wildlife conservation areas. EWCO, Addis Ababa.
- Hillman, J. C. 1992. The Government of Ethiopia - Wildlife management policy and strategy. Addis Ababa, October 1992.
- IPCC.2007. Climate change 2007: The fourth assessment report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press.
- McMichael, A. J., Woodruff, R. E., and Hales, S. 2006. Climate change and health: Present and future risks. *Lancet*, 367: 859-69.
- MEDaC.1999. Poverty situation in Ethiopia, Ministry of Economic Development and Cooperation, Addis Ababa, Ethiopia.
- MoFED. 2006. A plan for accelerated and sustained development to end poverty (PASDEP), 2005//06 – 2009/10. Addis Ababa.
- Nkomo, J., Nyong, A. and Kulindwa, K. 2006. The impacts of climate change in Africa. Report prepared for the Stern review. [www.sternreview.org.uk](http://www.sternreview.org.uk).
- NMA. 2001. Initial national communication of Ethiopia to the UNFCCC. Addis Ababa.
- NMA. 2006. Agro-meteorology bulletin, Addis Ababa, Ethiopia.
- NMA.2007. National adaptation programme of action of Ethiopia (NAPA). Final draft report. National Meteorological Agency, Addis Ababa.
- Shibru T. and Kifle L. 1998. Environmental management in Ethiopia: Have the national conservation plans worked? Environmental forum publications Series No. 1. OSSREA, Addis Ababa.
- UNDP, HDR 2007/08).Human Development Report 2007/2008. Fighting climate change: Human solidarity in a divided world. Washington, D.C: The World Bank
- Vincent, K. 2004. Creating an index of social vulnerability to climate change for Africa. Tyndall Centre for Climate Change Research. Working Paper 56.

## Geo-physical Features and Vulnerability to Climate Change

Famous for its natural beauty, Nepal is also at great risk from the impacts of climate change. As the country with the highest poverty rates in South Asia, it is ill equipped to deal with the implications of increased temperatures, flash flooding and other environmental changes that have become more frequent in recent years. Nepal has a total landmass area of 147.2 thousand km<sup>2</sup> and with 80 percent of its 28.58 million inhabitants depending on agriculture (IPCC 2007a), changes in predictability of the climate have an enormous impact. Nepal fares badly in several development indicators, which lessens its capacity to respond to environmental change. The GDP per capita (PPP) is US\$ 1,049 and life expectancy at birth is 66.3 years. The value of its Human Development Index (HDI) is 0.509 (UNDP 2009), placing it at 144, among the lowest in the world. The past decade and a half in Nepal has been marred by intense political turmoil as a result of the rebel insurgency and civil war between the Government and the Maoist party that officially ended with the signing of a Comprehensive Peace Accord (CPA) in 2006. As the country makes a slow recovery, it is imperative that steps are taken to adapt to the multiple impacts of climate change, particularly among the poorest and most vulnerable communities across Nepal.

Despite one of the world's lowest global rates of greenhouse gas emissions (0.025 percent), Nepal is one of the countries most vulnerable to the impacts of climate change. Many of the consequences of climate change in Nepal are due to geographical changes across the Himalayan region. Temperatures in Nepal have increased 0.6°C per decade compared to a global average of 0.74°C over the last 100 years (ICIMOD 2009:1) and there are indications that temperature changes have been more pronounced at higher altitudes, with hotter summers and cooler winters (CARE 2009) – what is termed extreme climate variability.

'Floods are the main natural disaster aggravating poverty in the Himalayas and downstream' (ICIMOD 2009:15). Floods destroy agricultural land, homes, infrastructure and human lives. Worryingly, large floods are expected to increase in Nepal in coming years due to temperature rises across the Himalayan region and subsequent glacial melt. Glaciers, which are reservoirs of freshwater at high altitudes, are melting and feeding into glacial lakes. When such lakes become too full they burst, causing glacial lake outburst floods (GLFOs) – which have catastrophic consequences. The IPCC has declared 'with high confidence' (IPCC 2007a) that one of the impacts of climate change is 'enlargement and increased numbers of glacial

lakes' (IPCC 2007b). There are currently around 2,323 glacial lakes in Nepal, of which 20 are hazardous. As a result of a GLOF in August 1985, 10-15 metre high wave of water and debris surged down the Dudh Koshi and Bote Koshi rivers for a total of 90 kilometres, causing incalculable damage to infrastructure (e.g. a hydropower project), homes, land and livelihoods. Landslides are another result of increased water levels in rivers. In one district of Nepal alone, landslides killed more than 37 people between 2003 and 2009, left 100 households without homes, and caused damage of US\$1m (CARE 2009). Changes in monsoon predictability and patterns have resulted in crops being destroyed.

IPCC (2007a) also notes decreasing biodiversity as a major problem, due to its impact on food security. Local level livelihood studies find evidence that biodiversity loss and precariousness of local livelihoods are linked, with each impacting the other. In order to make ends meet, communities facing severe difficulties securing basic needs tend to exploit the natural goods and services on which they rely, while at the same time changing ecosystems force communities to face much more insecure livelihoods. Climate change in Nepal has the potential to send the delicate relationship between ecosystem protection and livelihood security into a downward spiral.

Diseases such as malaria and Japanese encephalitis are becoming common in previously un-affected areas (CARE 2009; ANFPa 2009), with mosquitoes being observed at higher altitudes than has previously been known (Eriksson et al. 2008). A recent study by CARE indicates an increase in the development of allergies and skin infections as a result of intense heat – to which women and children are more prone. Floods also bring with them negative health implications. Inhabitants of an area recently affected by heavy flooding noted that more than 60 percent of children and the elderly faced water-borne diseases such as cholera, diarrhea and skin infections in the immediate aftermath of flooding (CARE 2009). Despite strong evidence of direct health impacts on communities, research on the health implications of climate change in Nepal is extremely limited at this stage.

## Peoples' Testimonies on the Impacts of Climate Change

The impacts of climate change are most keenly felt by the most vulnerable; in the case of Nepal, the burden falls most heavily on those that have historically been most marginalised in Nepali society, especially Dalits (ANFPa 2009). However, studies in Nepal strongly suggest also that women are more vulnerable to climate change impacts than men (Regmi et al 2009; CARE 2009). In particular, due to women being responsible for water collection, they are most affected by changes in access to water – be it changes in quantity or in collection points (ibid.). Women are also the primary caretakers in cases of illness from new diseases such as malaria, as well as those responsible for

## Bajaru Tharu Seeing the Changes

Bajaru Tharu, 47, lives in Phattepur, in the south western Banke district of Nepal. He migrated from the Dang valley some forty years ago with his parents, and now lives in a joint family of 19. Subsistence agriculture is the mainstay of the people in this area: Bajaru has a small piece of land, some cattle and draws on his family to provide the necessary labour.

Flash floods are not a new phenomenon in Phattepur, but villagers are facing increasing stress from their mounting frequency, as well as other climatic hazards such as drought and temperature extremes. Bajaru recalls, "When we migrated here from Dang, we had a better life: crop productivity was good, we did not have a problem arranging food [Bajaru enjoyed effective food security]. But now we face sometimes severe malnutrition. Floods coming through the forest would bring decomposed leaves onto our land, creating very fertile soil for us. We never experienced the flooding of the Rapti [the nearby river]. But the river bed has risen and river flooding is now not uncommon, especially since around 2006. And it also wiped out our cattle and food grain stored in the house."

Temperature extremes are also a big problem now. Bajaru's 75 year old father explains that ground temperature has a large effect on the productivity of rapeseed, grams, potato and lentils. The family used to grow fair quantities of these crops. But the cold waves have decimated yields. The old man's pain shows, "I used to grow fifteen quintals [1500 kg] of lentils and twenty quintals [2000 kg] of gram. Now I can hardly grow five of lentils and two, maybe three, of gram. It does not cover my expenses for seeds, fertilizers and labour wages."

Droughts and heat-waves are also an escalating problem. Bajaru and his family have a long list of difficulties caused by high temperatures and lack of moisture in the early summer: Most severe are the heat stress on work animals and labourers, the further detrimental impact on crop yield, and the resurgence of endemic diseases (jaundice, skin diseases, viral fevers, and diarrhea) that thrive on the climatic environment.

Source: RIMS Nepa.

the home when males migrate for employment because of decreased opportunities to earn a living from the land. Many climate change impact assessments, however, continue to overlook the differences in impacts between men and women and thus it remains difficult to draw conclusions on the exact extent of the impact that climate change is having on women in Nepal – this is an important area for research. Below are four case-studies of affected individuals, households and communities across Nepal.

"We have no certainty about the weather these days. In the past we knew we would get a little rain in the winter, not just in the summer months. Winter rain is so important for our winter crops. We used to be able to rely on the seasons to help us in our agriculture and livelihoods. We would sow the maize seeds after the rains in May and go plant in the paddy fields at the beginning of the summer. But now every year is different, we don't know what will happen. Increasingly we sow the maize before any rainfall. And some years we endure very long droughts until the end of July! How can we plant our crops in time?" asks 25 year old Bir Badahur Chepang from Jawang, a village in Dhading District. Min Maya Chepang recounts a similarly bitter story, "I used to cultivate Sathiya maize, [a local variety that grows in only sixty days]. It is used to be very productive. But now I have had to give up on that variety because I cannot count on the weather."

Another farmer, Mr Prem Bahadur Chepang, recalls the acute hardship of last year's prolonged drought. The maize on which his family relies died and they faced starvation.

At that time everyone in the village was forced to go into the forest to forage for wild tubers and other edibles. But even wild yam was scarce because of the drought, and villagers spent days and night searching for food. Prem Bahadur has good knowledge on the diversity of yam varieties, "We have ten different species of yam: Gittha, Bhyakur, Tarul... But if the drought continues like this, increased pressure on the forest will result in the loss of many of these varieties. Already now we can't find all the species as easily as we used to." Prolonged drought, high winds and hailstone have especially affected fruit. Orange blossom is often destroyed by wind and hail, and drought slows the growth of the fruit. Orange was once a good source of income in Jawang, not any more. Hom Kumari Chepang also wonders why plum trees flower in February now instead of March or April, as traditionally expected. Villagers have also noticed that in recent years the Sal, one of the most valuable timber trees of the area, sheds its leaves at least a month earlier than in the past. Birka Chepang, a young Chepang leader in Jawang concludes that increased climatic uncertainty has made the community people's livelihoods much more precarious.

One of the respected elders of the village, 65-year old Aita Ram Chepang, believes that his community is forgetting to respect nature. He says he can see the exploitation, and believes that a god may be angry and punishing them: "If people continue not to look after nature, [the god] will only make it even more difficult!"

## Grasslands are Disappearing; Scarcity of Food-stuff for the Livelihoods

Seventy six year old Darma Raj Paudel is an agro-pastoralist from Padumari, a hamlet in the Gorkha District of Nepal. For the last four decades he has been rearing cattle. His father and grandfather did the same. But while past generations enjoyed a prosperous existence, life is increasingly hard for Darma. Grasslands in the temperate high hills on which he depends are shrinking, invaded by Chutro and Gurans bush. Over the past twenty years, these bush species, traditionally found in the lower regions, are creeping up the hills. "I don't know why the grassland is disappearing. Why are these bushes invading the higher pastures? We can no longer feed our cattle. And we do not have much education, so we can't get other jobs. And we have nowhere to migrate to. Why is nature punishing us like this?"

In Padumari, part of the Kharibot Village Development Committee, this story is found in the mouths of most of the community. At 2800 metres in altitude, the area is not suited to other types of income-generating land use. But the people's traditional occupation of pastoral livestock-rearing is no longer securing their livelihoods.

Ecologists agree that increasing carbon content of high altitude air permits Chutro and Guran bushes to survive on higher parts of the hills. This is transforming the form of the social economy: "Many people have left cattle rearing. Everyone can see the number of cattle sheds in the village has decreased sharply. I think we only have one third of the cattle that we used to compare to twenty years ago. It's all because of the invasion of bush on the pasture land. I only have eight cattle left that is just not enough. I'm going to have to start doing something else, but I don't know what. There are not many alternative opportunities for me."

How else can the people of Padumari adapt? Darma looks defeated, "What can we do? If we cut the bush down, it only grows back even more aggressively! And we can't uproot the whole forest! The government needs to help us control it."

Source: Lila Nath Sharma, Tribhuvan University, Kathmandu

## Kariga Tharu Lost Land and Household Assets

Kariga Tharu is from Kanchanpur, Banke District. "The impact of decreased rainfall and flooding is massive in our village. I lost around 1 hectare of my agriculture land, two dozen livestock and a house. My agricultural land was converted into desert land. Less rainfall led to loss of local landraces (deruwa, syajira, sunga pankhi, rudhani, dhanmuniya), increased land erosion hence contributed to conflict between landowner and tenants. Climate-induced disasters decreased food security and now I can feed my family for only 6 months. It damaged 7 hectares of forestland and contributed to the loss of major species. The flood also damaged infrastructure (roads and buildings)."

Source: SAGUN Program, CARE Nepal 2009.

## Measures in Place to Battle Climate Change

In 1992, Nepal signed the United Nations Framework Convention on Climate Change (UNFCCC) and in 2005 became party to the Kyoto Protocol. At present, Nepal is

the only LDC that has not prepared its National Adaptation Programme of Action (NAPA). Having been granted a 1-year extension until December 2009, it remains unlikely that the Government of Nepal will complete the task by this date. The NAPA project is being supported by UNDP in Nepal. The Government has prepared an initial draft of a National Climate Change Policy, with support from the European Commission (EC) and WWF Nepal; however, this has not been finalised or been passed through Parliament.

Like other LDCs, Nepal's contribution to the process of global climate change is low. Therefore, the focus needs to be on adaptation to climate changes rather than mitigation. Climate change projects are in early stages in Nepal, and largely involve projects to determine the human impacts of climate change at community level, as is currently being carried out by WWF Nepal and local partners such as RIMS Nepal. A national consultation on climate change was hosted by Rural Reconstruction Nepal, a national NGO in November 2009. Recent adaptation projects in Nepal are employing a community-level strategy to climate change adaptation, with many containing a strong research element, drawing on experience in the related fields of disaster risk reduction and natural resource management. Large investments in infrastructure are an essential part of the adaptation process. However, in the context of Nepal, community-based models of resource management that aim at sustaining and enhancing the livelihoods of vulnerable people, are considered to be a large part of the necessary

response to climate change. Grassroots initiatives need to be one of the main points of departure for the identification and assessment of adaptation strategies.

## Conclusion

The fact that Nepal remains the only LDC who has not completed its NAPA before CoP 15, is not an encouraging sign for CSOs or for Nepali citizens. Many civil society organisations see this as demonstrative of the fact that the Government has been slow and in some cases reluctant to take leadership on the issue. However, there are also practical implications for NGOs and CSOs, which are the source of some frustration – that is, that organisations in LDCs are not eligible to apply for funding under the Global Economic Facility (GEF) of the LDC Fund until the NAPA has been completed, which further delays relevant activity on climate change in Nepal. The need for quick action is clear – from the government as well as the international community.

Aita Ram Chepang noted that current difficulties are the result of people not looking after the land. However, what he does not realize is that what the impacts that the residents of Nepal and other LDCs are suffering are not strictly or even mostly their fault. Developed countries achieved their own economic development at the incalculable expense of the environment and human livelihoods in other parts of the world. We as Nepali civil society want to use CoP 15 to emphasize this message, and ensure that solid commitments are made to reducing future impacts, so that stories such as those of women, Tharu and Chepang communities do not become even more commonplace.

## References

- All Nepal Peasants Federation (ANPFa) (2009) Impacts of Climate Change on Food Security Under Market Mechanisms: Focusing Dalit and Fisher-folks of Nepal
- CARE Nepal (2009), Strengthened Actions for Governance in the Utilisation of Natural Resources (SAGUN) Program – Study Report
- Eriksson, M., Fang J. and J. Dekens (2008) How Does Climate Affect Human Health in the Kindu Kush-Himalaya Region? Regional Health Forum 12(1):11-15
- International Centre for Integrated Mountain Development (ICIMOD) (2009) The Changing Himalayas: Impact of Climate Change on Water Resources and Livelihoods in the Greater Himalayas
- IPCC (2007a) Up in Smoke? Asia and the Pacific: The Threat from Climate Change to Human Development and the Environment
- Intergovernmental Panel on Climate Change (IPCC) (2007b) IPCC Fourth Assessment Report (2007) Climate Change 2007: Impacts, Adaptation and Vulnerability
- Regmi, B. R., Thapa, L., Suwal, R., Khadka, S., Sharma, B. D. and B. B. Tamang (2009) Agro-Biodiversity Management: An Opportunity for Mainstreaming Community-Based Adaptation to Climate Change
- Journal of Forest and Livelihood 8(1):111-119

## Geo-physical Features and Vulnerability to Climate Change

Like many other African countries, Senegal is experiencing the effects of climate change at several levels. The impact of this change is examined for two sectors on which nearly 75 percent of the population depends for their living. This aims to highlight not only the immediate impact on people's lives but also the serious implications of climate change for the long-term development of the country.

In Senegal, climate change has translated into the drying up of lakes and waterways in some parts of the country, the spread of desertification but also floods and out of season rains. Successive droughts and floods makes the production cycle unpredictable. This has serious consequences for food production and for agriculture in general on which more than 60 percent of the country's population depend for their living. For instance, food production has dropped dramatically as a result of the impact of climate change. Already, Senegal covers less than 50 percent of its needs in cereals, making it a net importer of foodstuffs and increasing its external dependency and debt. The deficit in this area has increased from 97 to 186 billion cfa francs between 1997 and 2002<sup>8</sup>. Each year Senegal registers a net loss of 150 billion cfa francs due to imports of foodstuffs.

During 2007/2008, Senegal spent 232 billion cfa francs in subsidies for food products of mass consumption, such as rice, wheat, milk and wheat flour, among others. To give a measure of the food dependency, one should bear in mind that prices of food have tripled between 2007 and 2008. The price of rice, the main cereal imported by Senegal, has tripled between August 2007 and April 2008. It increased by 180 percent between January and April 2008! To further give an idea of the difficult situation of Senegal in the area of food, one should know that Senegalese households devote nearly half (46 percent) of their income to spending on food and beverages, according to the National Statistical Agency.

However, the impact of climate change is not limited to the agricultural sector. The fisheries are affected sometimes in a more dramatic way. According to experts, fisheries will be worsened by climate change for several reasons. In Senegal, in coastal cities, like Dakar (the capital), Rufisque, Mbour and Djiffer, among others, the sea level is rising with serious consequences the inhabitants of these cities, especially for the fishermen and their families. Over the last few years, climate change has destroyed housing and facilities in sensitive areas. In recent years, it has become more difficult to find fish nearby as in the past. This forces fishermen to go beyond Senegal waters to

neighboring countries, like Gambia or Mauritania. This has resulted in incidents sometimes accompanied by loss of life.

## Climate Change and its Impacts on People's Livelihoods

The most dramatic impacts of climate change on fishermen is the rise in recent years of the phenomenon of illegal migration that has led thousands of young fishermen to give up their activities and embark on the adventure of migration to Europe.

Some of them have transformed their rickety boats into means of transportation to migrate to the Canary Islands. However, women are even more negatively affected by this climate change. For instance, a report entitled Gender, Climate Change and Human Security, by Women's Environment and Development Organisation (WEDO), looks at various cases, including women in fisheries in Senegal and Ghana<sup>9</sup>. The Senegalese coasts are exposed to climate change through the erosion of sandy shorelines. Erosion destroys the infrastructure and housing in sensitive areas.

Women in Senegalese fisheries, who control the processing sector, will be affected by the disappearance and the displacement of their work centers and habitat inland. Hard working conditions and the lack of energy sources for the processing activities also make these women more vulnerable. With more men attempting to leave for migration, the situation of these women has become even more desperate. When one adds to this the migration phenomenon evoked earlier one understands how precarious the situation of these women has become.

To cope with this situation, Senegalese women have involved themselves in multiple economic activities in addition to the fish processing activity. Some of them have also started informal saving schemes, like Tontines. Other strategies include organising themselves into cooperatives, financing fishing trips and inputs so they can have first access to the day's catch. In spite of these measures, climate change and dwindling stocks have affected the whole social structure of the communities and limited their ability to maintain the security of their families. Many of them complain about their inability to pay for school fees and medical bills.

Therefore, the impact of climate change on two vital sectors in Senegal – agriculture and fisheries – on which almost 75 percent of the population depend for their living, has accentuated the economic and social problems of Senegal. The contribution of these two sectors to the gross domestic product (GDP) has steadily decreased in favor of the services sector. This explains why the majority of the households called poor are in the rural and fisheries areas.

Experts predict a fall of 50 percent of food production by 2020 if nothing is done in the area of environmental degradation. It is clear that this would be an unsustainable situation in the area of food. This calls for an urgent need to implement policies aimed at tackling climate change. In this regard, civil society organisations (CSOs) working on environmental issues urge the government of Senegal to ratify and implement all the Conventions on environment that it has signed.

## SOLOMON ISLANDS

### Geo-physical Features and Vulnerability to Climate Change

Solomon Islands, a scattered archipelago of about 1,000 mountainous islands and low-lying coral atolls, lies over 800,000 km<sup>2</sup> of sea, stretching east of Papua New Guinea in the South Pacific and lying between Bougainville and the northern islands of Vanuatu.

As part of the Pacific rim of fire, and being inside the cyclone belt, Solomon Islands is highly susceptible to natural disasters, earthquakes, landslides, cyclones and flooding which results destruction of homes, food crops and sometimes lives. 90 percent of Solomon Islanders live in rural villages on customary land, and are almost entirely dependent on the productivity of their land and sea resources. The future of these precious resources is being threatened by climate change. Climate change is emerging as a crucial issue for the nation, particularly for low-lying regions and those that are subject to flooding. Here, the impacts of climate change are affecting valuable village gardens, sources of fresh water and healthy reefs where islanders have fished for generations. While individual events cannot be proof of serious climate change, the multiple events, the observations in nature, the observations by people living close to nature tell the tale.

Climate change, combined with high population growth, over exploitation of forests and marine resources, and an increasing demand for cash to supplement subsistence incomes is placing unsustainable pressure on the our natural resources and the people who depend on them to meet their everyday needs. The small low lying atolls are especially at risk of complete inundation due to sea level rise .There will be less land available for crop production;

### Looking to the North from a Disappearing Island: The Story of Patterson Baea, of Sepo Hite Island, in the Western Province

SEPO HITE ISLAND: While climate negotiators gather in Copenhagen in December, **Patson Baea**, 48, in the Solomon Islands, will also be looking to the North. But he won't be watching television broadcasts of the proceedings - he'll be watching the wind.

Baea has lived all his life on a coral island that is disappearing into the sea. "December is the worst because of the North wind blowing the waves onto the island," he says."The coastline is washing away now, three to four feet every year washes off. The tides are getting very high now. The water never used to cover here," he says, pointing to a line of mangroves at the end of the island, "but now they do go under."

Now, Baea fears that he and his family may have to leave the island that his father owned before him; a grim prospect. "For me, my life has been on this island, and me, I'd wish to stay on this island until I'm dead," he says.

It's not hard to understand his attachment to Sepoe Hitae Island. It looks like a postcard paradise. Seated on the deck with the blue sea rippling below, Baea and his family look out over a vista of water, sky and thick green mangroves. The doors and windows of their wood and palm thatched house are almost permanently open to the balmy air. On a calm day, the sea seems to lap too gently to be a threat. But when high tides combine with high winds, the low-lying island offers the family little refuge. Baea says he tries not to cut any trees at all, and has planted mangroves to help combat erosion. But the sea is advancing. Predictions of further rises in sea levels linked to climate change have Baea deeply worried; with such a small margin of safety now on their island, even small differences are a threat.

For his part, Patson Baea has no doubt that the climate in his part of the Solomon Islands is changing. "It's warmer and warmer," Baea says. "And it's very unpredictable now. My father used to say 'this is the wet season' and 'this is the dry season'; now, it's everywhere."

The encroaching sea makes everything uncertain. Within a half-hour boat ride of the popular coastal town of Gizo, the family had hoped to make a living from ecotourism. But the 2007 tsunami that devastated parts of the Solomons caused a sea surge that swept across their island and battered the wooden lodge they'd built for house visitors. Although the tsunami was not a result of climate change, Baea and his wife aren't certain it's wise to invest in rebuilding on an island they may have to abandon.

For the moment, they are exploring coral farming, and perhaps lobsters. But again, they are wary. Certainty is in short supply. "We've been to the Lands Office to try to get any land on higher ground. But at the moment, I don't think there's a policy on what to do," Baea says. "The effect is that I think basically people are getting scared now."

most of the agricultural lands either will be inundated or will be contaminated with the ingress of saline water. On the other hand, reef and marine resources also will be affected severely. Increased ocean temperatures will degrade coral reefs which also will affect productivity of those species dependent on reefs. Some migratory species, such as tuna, may move to areas where ocean conditions are more suited for their survival.

The Solomon Islands are right at the centre of the Coral Triangle, which spans the seas of six countries, the others are Papua New Guinea, Malaysia, Indonesia, the Philippines and Timor Leste. The Coral Triangle has over 30 percent of the world's coral reefs, and 76 per cent of reef-building corals. But, over the past 40 years, some 40 percent of the region's reefs and mangroves have been lost. And unless the world takes decisive steps to combat climate change, an ecosystem that supports the livelihoods of 100 million people could be irreversibly damaged by rising temperatures, acidification and rising sea levels. Under a worst-case scenario, with little or no action on climate change, the ability of reef systems to provide food for coastal populations would decline by 50 percent by 2050 and by 80 percent by 2100. Sea level rises that inundate low lying areas may threaten homes, gardens and crop areas and fresh water supplies. Ultimately, whole communities may need to relocate.

## Conclusion

The beginning of the 21st century is a pivotal time for industrialised nations to break the pattern of unsustainable resource use and pollution that has characterised the past.

2010 falls in the middle of the so-called first 'commitment period' (2008 -2012) agreed in the Kyoto Protocol, at the end of which signatory industrialised nations should have reduced their emissions by 5.2 percent below their 1990 levels. 2009 in Copenhagen: It's time to act now.

### TIMOR LESTE

## Geo-physical Features and Vulnerability to Climate Change

Timor Leste was colonised by Portuguese for 500 years and was occupied illegally by the Indonesian military for 24 years. During these years of occupation and colonisation, the people of Timor Leste lived as captive in their own country, particularly those living in rural areas. Following the 1975 invasion, many people became IDP's and survived in the hills without any food and shelter; it was a big famine and many children died of malnutrition. Timor Leste became the first new nation of this millennium on May 20, 2002 following a quarter century of occupation and conflict. The country experienced a fundamental destruction after

the people voted for independence from Indonesia in a referendum in August 1999.

The total population of Timor Leste is less than 1 million, and around 75 percent of the population lives in rural areas where subsistence agriculture is the dominant livelihood activity. In Timor Leste, among agricultural households, incomes are linked to the level of assets. Poverty is a complex phenomenon that involves multiple deprivations. Economic well-being varies across the country. Poverty affects two in five persons and predominantly affects rural areas and its incidence is higher in the West than the East. 40 percent of the population is illiterate, and the maximum level of education is secondary level. The rate of unemployment is very high, especially among the youth.

Timor-Leste has amongst the highest rates of malnutrition in Southeast Asia, with acute malnutrition rates being unacceptably high. 90 percent of the population suffers from food shortages for at least one month a year, with the majority suffering from shortages for 3-5 months. Poor feeding, hygiene, and caring behaviors, some traditional norms and cultural practices, inaccessible health services, recurrent infections, household food insecurity, including food production, management, and storage, gender disparity, and poor socio-economic and environmental conditions all contribute to the poor nutritional status of the Timorese population.

Improving agricultural productivity is one of the priority strategies for improving food security. Upland areas are more vulnerable to climatic and other shocks than the lowland areas. Low agricultural productivity is compounded by lack of roads and transportation and frequent natural disasters, which are all limiting access to markets. Key environmental issues include unsustainable farming techniques (Hivos 2009).

## Detrimental Behaviour; But No Way Out?

**Manuel de Jesus** used to be a wood seller. From his experience he explains that lack of control of farmers to stop felling trees, has contributed to climate change. "There is no other option than for us to continue felling trees and selling it and for people to buy it. It is a big part of our livelihood as we get the income from this activity." He notes that "This country is very rich, we have oil and gas, we have huge natural resources but we cannot use them, we gave the opportunity to the big companies to explore our natural resources but we don't have scope to use them. Only few Timorese that can afford to buy gas or petroleum as another alternative. So since we don't have new alternatives then we do this work of selling woods to households. Now I realize that this activity had contributed to climate change, the impact that we face is that the temperature is very high and almost every day I feel very hot. I cannot breathe fresh and cold air anymore, as I used to ten or fifteen years ago."

In Timor Leste, rainy season usually starts in late October and ends in March or April and now we are seeing the changes; for example this year rain starts in December and ends in March. The seasonal agricultural products – such as corn, rice, vegetables and other food crops – that usually grow well only in the rainy season are affected by these changes. In some parts of Timor Leste, particularly in Southern and Eastern parts of the country, the high soil humidity favours production of certain crops like rice and corns throughout the year. However, during Portuguese colonisation, monoculture was widely adopted, whereby most farmers shifted their attention to growing only coffee rather than mixed products that were adaptable to the soil. For example, Ermera district is the largest coffee plantation and there only one product is planted. Once the price decreases on the international market, the farmers don't have any other options for survival.

## Dealing with Water Shortages in Baucau

**Mrs. Rosa**, a farmer from Baucau district, said that climate change has affected her life, particularly in terms of water resources. "We face difficulties to manage water for daily use. Every day we have to walk for almost three kilometres to get water for household uses and for our children. Our village is situated right at the bottom of a famous mountain called Matebian. Once, this was an abundant source of water and we knew that we could always collect water from this source. But in recent years, water is gradually becoming scarcer. Now I and my neighbours have to walk around 2 hours every day to collect water. In our culture, women and children have the responsibility to fetch the water. With this situation, we are not only walking for about two hours to fetch the water but also we need to wait until a sufficient

volume of water gathers to allow everyone to collect and fetch the water. Again, due to reduction in soil moisture we do not get good harvests of quality vegetables, onion, potato, cassava etc. Once our land was very productive and fertile; now we are getting minimum outputs from our lands.

## Changing Climate? Coffee-Growing in Timor

"Since I was young, my experience as a coffee grower has been very different to what I am experiencing now", said **Ms. Adelina**. "My district is well known for coffee plantations. The farmers have been growing coffee since our ancestral time and every family has a huge coffee plantation. I actually don't understand what climate change is but I feel that the weather is different from the past. Now we are facing long drought. During the last two years we could not harvest the coffee due to low productivity." She explained that "when the coffee flower starts to grow, sometimes strong winds destroys the blooming flowers; again sometimes we face little or delayed rain at the time of blooming, and consequently the coffee becomes dry. At the moment we are trying to organize a reforestation program with our youth in my village and we are also developing our communal farm together."

## Conclusion

The devastation of the ecological resources by colonial as well as military occupancy by the Portuguese and Indonesians should be considered as 'Ecological Debt'. The people of Timor Leste deserve to have this enormous debt paid back to them.

### End Notes:

- 1 Bangladesh Department of Environment (2006): *Climate Change Impacts and Vulnerability*, A.U. Ahmed, Climate Change Cell.
- 2 The study jointly conducted by GERES and CEDAC and surveyed in four provinces with different ecosystem and involved more than 300 people.
- 3 For example: National Center for Parasitology, Entomology and Malaria Control, n.d.; Jacobson, 2004; Department of Planning and Health Information, Ministry of Health, the Reproductive Health Association of Cambodia, and Population Reference Bureau, n.d.
- 4 Up-to-date information regarding Cambodia's current greenhouse gas (GHG) emissions profile is limited. Reliable information is confined largely to the Cambodian Government's 2002 Initial National Communication to the UNFCCC, which is based on data from 1994.
- 5 Nesbitt, 1996 (cited in Tin *et al.*, 2001b).
- 6 The social vulnerability index is a theoretically-driven index formed through weighted averages of the following five sub-indices: economic well-being and stability, demographic structure, institutional stability and strength of public infrastructure, global interconnectivity and natural resource dependence. According to the index, the eight African countries with the highest level of social vulnerability in the order of their vulnerability are Niger, Sierra Leone, Burundi, Madagascar, Burkina Faso, Uganda, Ethiopia and Mauritania.
- 7 The patron of the Appeal is Kenyan environmentalist and Nobel Peace Prize laureate Wangari Mathai but the overall coordination and organisational responsibilities were undertaken by the Ethiopian environmental advocacy CSO, Forum for Environment.
- 8 1euro equals 655 cfa francs.
- 9 WEDO *Gender, Climate Change and Human Security: Lessons from Bangladesh, Ghana and Senegal*, May 2008

## About this issue

The 49 Least Developed Countries (LDCs) are the least responsible for the rising global green house gas emissions yet most affected by the ensuing climate change catastrophe. In certain cases, such as the small island LDCs are all at risk of submersion from rising sea levels. Others are experiencing erratic precipitation, desertification, bio-diversity loss as well as melting glaciers that are leading to increased droughts and floods. These have devastating consequences especially for agriculture - which is the mainstay of the LDCs - thereby exacerbating the ongoing hunger crisis and food insecurity.

The lives and livelihoods of around 785 million people residing in the LDCs are already at stake, further perpetuating poverty, injustice, social unrest and overall human rights violations in these countries. LDCs, therefore, require special attention from the interests of the developed and developing countries. LDCs deserve and demand climate justice!

In addition, we also present some case country studies that are supported by peoples' testimonies, speaking of climate change effects on their daily lives and livelihoods. Amidst all the ongoing noise about climate change and the COP15, the very voice of peoples who are suffering from the climate change fallout NOW is simply ignored or falling on deaf ears. LDC Watch, therefore, endeavours herewith to bring together these important voices from the ground.

I thank, with much appreciation, all my colleagues and friends for their cooperation and contributions and look forward to your continued support and spirit in our struggle for climate justice.

**Dr. Arjun Karki**

International Co-ordinator, LDC Watch

## Contributors

Bangladesh	: Equity and Justice Working Group Bangladesh (EquityBD)
Cambodia	: Tong Chantheang
Ethiopia	: Alebachew Adem and Negusu Aklilu
Nepal	: Rural Reconstruction Nepal (RRN), and All Nepal Peasants Federation (ANPFa)
Senegal	: Demba Moussa Dembele
Solomon Islands	: Development Service Exchange (DSE)
Timor Leste	: Lita Sarmiento and Antero Benedito da Silva

## About LDC Watch

LDC Watch is a global alliance of national, regional and international civil society organisations (CSOs), networks and movements based in the LDCs in partnership with civil society organisations from development partner countries. It acts as a coordinating group for LDC civil society to advocate, campaign and network for the realisation and review of the Brussels Programme of Action (BPoA) for LDCs for the Decade 2001-2010 including other internationally agreed development goals (IADGs) such as the Millennium Development Goals (MDGs). It goes beyond the BPoA in addressing poverty, hunger, social injustice and human rights in the LDCs. LDC Watch evolved out of the NGO Forum process that was held in parallel to the Third UN Conference on LDCs (UN LDC-III) in Brussels in 2001.

## Contacts

### International Secretariat

LDC Watch  
P. O. Box: 8130, 288 Gairidhara Marg, Gairidhara  
Kathmandu, Nepal  
Tel: +977 1 4004976, 4004985  
Fax: +977 1 4004508, 4443494  
E-mail: [info@ldcwatch.org](mailto:info@ldcwatch.org)  
Web: [www.ldcwatch.org](http://www.ldcwatch.org)

### European Co-ordination Office

Eurostep  
115 Rue Stevin, B – 1000, Brussels, Belgium  
Tel: +322 231 1659  
Fax: +322 230 3780  
E-mail: [eurostep@ldcwatch.org](mailto:eurostep@ldcwatch.org)