

A HUNGRY TIDE

THE LEGAL RESPONSE TO CLIMATE CHANGE ADAPTATION AND REPARATION

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“Beauty’s nothing but the start of terror we can hardly bear, and we adore it because of the serene scorn it could kill us with”².

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² Amitav Ghosh, *A Hungry Tide*, Houghton Mifflin, London, 2005

“The field of law has, in many ways, been the poor relation in the world-wide effort to deliver a cleaner, healthier and ultimately fairer world...”³.

1. Introduction

There has already been a copious amount of research, discussion and writing on the issue of climate change; its causes; impacts; mitigation and adaptation needs that are sufficient to form a specialised library. Indeed, just the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report itself, generally acknowledged as the ultimate and irrefutable source of scientific information and impact projections, has over 2500 authors and runs to some 2,871 pages⁴. There has further been huge media coverage on the issue, fuelled by global popular interest, especially over the international community’s attempts to “*Save the Planet*”, or at least human life on it, through multilateral discussions at Bali involving over 10,000 participants⁵. Climate change concerns have spawned a large number of organisations and programmes to ostensibly campaign, or devise initiatives, to combat its effects. In short, the issue has surfaced as one of the most important, not only of our time, but that of future generations, plunging millions globally into environmental activism.

India has certainly not been immune from this activity. By virtue of her position as a rapidly developing nation whose greenhouse gas emissions (GHG) are set to double to 3000 million tonnes of carbon-dioxide by 2020⁶, and through the high-profile leadership of Indian Dr RK Pachauri, Chairman of the IPCC, recent years have seen a lot of both national and international interest⁷. However, notwithstanding this global interest and activity, what exactly is being done at the ground-level to prepare countries, in particular developing countries, for adaptation to the impacts of climate change that is contemplated in the international instruments and will undoubtedly occur? What are the exact legal obligations to do so? How are those obligations being practically operationalised?

³ Klaus Topfer, Executive Director of the United Nations Environment Programme, on the adoption of the Judges’ Johannesburg Principles on the Role of Law and Sustainable Development, August 2002.

⁴ Inter Governmental Panel on Climate Change (IPCC), Fourth Assessment Report (AR4), Cambridge, November 2007.

⁵ CoP 13, United Nations Conference on Climate Change, Bali, December 2007.

⁶ From 2000 figures see Subodh Sharma, Sumana Bhatnagar, and Amit Garg, *Greenhouse gas emissions for India: A Perspective*, Current Science, vol 90, no 3, 10th February 2006.

⁷ A recent visit to Delhi includes, Tony Blair, former Prime Minister of the United Kingdom, on “*Breaking the Climate Deadlock*”.

Climate change presents one of the most apparent legal rights issues, that those who are *least responsible* for causing the environmental problem will face the *most severe* damage to their environment. This is of course all the more serious in a country, such as India, where the majority of the population is dependent on their environment for their livelihood and sustenance. Climate change therefore creates not only scientific and moral issues around causes and impacts, but also complicated questions vis-a-vis legal obligations to prevent direct damage and reparations for residual damage which have, at least in the Indian context, not been fully considered.

Lawyers and legal practitioners should first and foremost aim to provide direct legal information to people so they can know their rights and obligations in the particular social, economic and environmental milieu. The paper intends to look at a real situation, the first example of *environmental refugees* as a result of climate change. It will set out the background to the case, the cost to the victims, the state response and finally the legal obligations of the state and the international community and how they are being performed. It is hoped that this will illustrate, through a real situation of climate change damage, how much is being done and more importantly, how much needs to be done, for the legal system to deliver justice to those who are being and will be affected by climate change.

2. The Case

The Indian Sundarbans covers a region of 9630 square kms in the coastal region of the Bay of Bengal. Out of the 9630 sq. km., 4264 sq. km. of Wetland / Mangrove constitutes reserve forests, which in turn comprises of 2195 sq. km. of Wetland – Mangroves and 2069 sq. km. of tidal river. This means that the reclaimed area of some 5,366 sq. km. (Figure 1) is used for human settlements in 19 blocks (13 in South 24 Paraganas & 6 in the North 24 Paraganas)⁸.

It is globally recognised as an area of almost unique ecological and conservation importance⁹. It is both the world's largest estuarine forest and mangrove forest containing fifty of the sixty

⁸ Sugata Hazra, Tuhin Ghosh, Rajashree DasGupta and Gautam Sen, *Sea Level and associated changes in the Sundarbans*, Science and Culture (ISSN 0036-8156), Vol 68, no 9-12, 2002, p 309-321

⁹ The world's largest inter-tidal area and largest estuarine delta. It contains the largest species of mangrove, the largest species of estuarine crocodiles and the largest number of Royal Bengal Tigers. It was declared a World Heritage Site in 1985 and a Biosphere reserve in 1989

mangrove species native to India which host its terrestrial, inter-tidal and aquatic environs. The hundreds of estuarine rivers, channels, creeks, swamps and backwaters make the Sundarbans particularly noted for its rich biodiversity. The area not only hosts around two hundred and fifty Royal Bengal Tigers, but also a number of other endangered species including the Olive Ridley Turtle which makes an annual appearance, the plumbeous dolphin, Irrawadey dolphin and the black finless porpoise. There are also estuarine crocodiles, rhesus monkeys, and chital and barking deer. It is recorded that the area has two hundred and fifty species of fish¹⁰, fifteen prawn species, sixty-seven species of crabs¹¹ and twenty-three species of other mollusks¹². There are more than 300 bird species (including 100 migratory birds) including herons, cormorants, egrets, kingfishers, storks and darters, more than 100 types of neries (plankton-feeding worms) that serve as food for fish and birds and a huge abundance of coastal flora. This includes orchids, ferns, micro fungi and lichens.

The population of the Indian Sundarbans is around 4.1 million people¹³. It remains, despite considerable infrastructure development, one of the least developed areas of West Bengal. The area is rural and 89 percent of the population is dependent upon agriculture on reclaimed land that produces a single paddy crop. Around 50 percent of the agricultural labourers are landless and that figure is rising. Fisheries also produce a major source of employment and income for the population, with nearly 42% of the population mostly schedule castes or tribes engaged in the industry. However, the fish stock is declining, for instance in the catch of *Hilsa* which has been reducing in the last four decades¹⁴. A small percentage of the population is engaged in fuel-wood cutting and honey collection. Consequently, the vast majority of inhabitants are dependent on the land and water for their livelihood¹⁵.

The population has also been rising rapidly, with a rise of a little over 160 percent just after independence. It is estimated that by 2020 the population of the Sundarbans will grow to at least 4.6 million or more. Such a rapid increase in population has had, and will continue to have, an adverse effect on the local environment. There have been changes in land use, such as

¹⁰ These include the blind gobid fish, a variety of eel, hilsa, pangasius, and several species of sharks and eels.

¹¹ These include the sand coloured Dotilla, Dotillosis, Sesarma (tree crabs), Nereita and Neritina.

¹² UNDP 2002 and 1986 Recommendations for World Heritage Site

¹³ 2001 Census.

¹⁴ See Hazra et al, figure 13.

¹⁵ See Hazra et al ibid.

conversion of mangroves to agriculture and aquaculture, caused by urbanisation, conversion for quick economic return or the exploitation of natural resources. It is predicted that mangrove forest cover will diminish further with its effect on existing freshwater fish species that may become extinct if appropriate adaptation measures are not made¹⁶.

3. Island Loss

Another Sundarbans phenomenon has also been given some recent attention by the international media. On the 24th April 2006, The Independent (London) reported the *first inhabited island to disappear* because of climate change. Lohachara Island, in the Indian Sundarbans, once home to 10,000 people, disappeared completely off the map due to severe coastal erosion caused by rising sea levels¹⁷. The neighbouring uninhabited island of Suparibhanga (Bedford) also disappeared during the same period totaling a combined land loss of 6212 square kilometers. Two thirds of another island, Ghoramora Island, has also eroded forcing the inhabitants to move to the largest island in the western Sundarbans, Sagar Island which is famous as a place of pilgrimage and which hosts the Gangasagar Mela every January. It is stated that 1200 families, or over 10,000 people, have been displaced due to this *island loss* in the Indian Sundarbans over the past four decades. There is estimated to be over 7000 *environmental refugees* from Lohachara Island alone living of Sagar Island¹⁸. Those displaced to Sagar have been accommodated in seven *colonies* scattered around the island¹⁹.

Island loss is an increasing concern both in the Sundarbans and globally. Of the 100 islands still existing in the Sundarbans, many face serious risk of disappearing in the next few decades. The main island in the Indian Sundarbans, Sagar Island, home to those refugees who have been displaced by island loss, has lost 30 square kms in the last thirty years. The populations of the villages of Khasimara, Baisnabpara, Khasimara Char and Baghpara have all been displaced and have had to move further inland to survive.

¹⁶ Species such as *Hertiera*, *Nypa* and *Zylocorpus*, see Hazra et al. *ibid*.

¹⁷ <http://climaction.blogspot.com/2006/12/global-warming-claims-first-inhabited.html><http://climaction.blogspot.com/2006/12/global-warming-claims-first-inhabited.html>, also Hazra et al. *ibid*.

¹⁸ See climaction.blogspot.com

¹⁹ Namely Gangasagar Colony, Jimbantala Colony (there are three), Bankimnagar Colony, Mahendragang Colony Hiradenpur Colony and Ramghar Colony.

It has been estimated that the island will lose a further fifteen percent by 2020 if the loss continues at the same rate. It is feared that this would render another 30,000 people homeless. The island of Namkhana will produce 15,000 by this time. Other islands that are considered to be at risk of disappearance include Ghoramara, Dublat G.P. of Sagar Island, G-Plot, Lothian, Dhanchi, Bulcheri, Bhangaduani, Jambudwip and Mousuni. Taking the Sundarbans as a whole, including the eastern Bangladesh side where island loss is more prevalent, it is estimated that 100,000 people could be rendered homeless by 2020²⁰.

Globally, this issue is also increasingly being recognised. Two uninhabited islands, Tebua Tarawa and Abanuea, in the Pacific Atoll nation of Kiribati, were covered in 1999 by sea, which was publicly attributed to global warming²¹. The populations of Vanuatu in the Pacific have been evacuated as a precaution, but island loss threatens small islands from Marshall Island in the United States to the Maldives, and has recently been recognised by the UN as a violation of human rights²².

Island loss is not the only problem facing small islands. The Sundarbans islands have also been prone to increased coastal flooding, failure of the erosion protection schemes and more severe cyclones. This has had a further impact on coastal erosion, destruction of life and property and the long-term security of the islands' inhabitants.

Of course general discussion about global environmental problems often masks the individual human costs that such problems cause. The Sundarbans phenomenon is no exception, and it provides an illustration of how physical impacts of this nature affect the most impoverished and most vulnerable of our planet the worst. In a recent visit to Sagar Island²³ the following cases were obtained through interviews, which highlight the economic loss and continued plight of the first environmental refugees of climate change.

²⁰ See Hazra et al, *ibid*.

²¹ Chang M: *Exclusive Economic Zones*, Department of Geography, Butte College (California) at <http://www.geography.about.com/library/misc/uceez.htm>).

²² <http://www.abc.net.au/news/stories/2008/03/29/2202652.htm?section=justin>

²³ March 2008. During the visit a number of officials were spoken to including, the Member of the Legislative Assembly, the District magistrate in charge of the Sundarbans and the pradhan of the panchayat of Sagar Island

- a) Sheikh Samsul was a resident of Lorachara Island. His family had 12-13 bighas²⁴ of fertile land on which he grew rice, watermelons and vegetable. Their income was supplemented through fishing. His family had a comfortable existence. The family lost their land around 25 years ago and moved to Gangasagar Colony on Sagar Island. Sheikh Samsul's families were given two bighas of reclaimed land by the local panchayat. His family, consisting of three sons and a daughter, survive on the vegetables grown on this land and prawns which they catch.
- b) Abhimuna Ghory was a resident of Ghoramora Island for two generations. Her family owned 17 bighas of land on which they grew rice and dhal and supplemented their income through fishing. On arrival on Sagar Island, his family was given 1 bigha and 15 cotta of land in Gangasagar Colony, which was of inferior quality to that which they had in Ghoramora.
- c) Sheikh K Abdul Motaleb was a resident of Lorachara Island. His family owned 60 bighas of land on which they grew vegetables and fruits. When they were displaced in 1983 they were given 2 bighas of land in Gangasagar Island. Sheikh Motaleb earns Rs2500 per month as an official in the youth hostel and whatever is earned from the land.

It is important to note that these examples are purely illustrative and do not represent the sum of the losses of those displaced through island loss. However it is clear from the above, that those affected have at least sustained severe economic loss, which has put them and their families economically and therefore socially back many generations. So is this simply a case of *bad karma*, or does the law have relevance to this situation?

²⁴ In West Bengal 3 bighas: 1 acre.

4. The Rise of Global Warming

The fact that the earth is warming due to human activity is today one of the most topical and concerning environmental issues, but it has only been generally appreciated over the last few decades. The possibility of man-made interference with the climate system was suggested as far back as 1827 by Fourier and then by the scientist Svente Arrhenius²⁵ and gained renewed global interest in the 1950's. However, it is only since the late 80's²⁶ and in particular since the IPCC published its First Assessment Report (AR1) in 1990, that scientists have begun to understand more about how the climate works and started predicting the changes and impacts on the earth's environment. Consequently, there remains a substantial degree of ignorance, and not a little sceptism, about the physical impacts, which have been attributed or are being attributed to climate change.

In the Sundarbans situation, there has been a long history of both island land loss due to erosion and indeed land formation or *accretion* caused through the depositing of silt by the rivers. Of course, the fact that this phenomenon has been occurring as far back as records were made, does not negate the fact that, from our current knowledge and understanding climate change could at least now be a contributory factor.

A Jadavpur University study²⁷ on the Indian Sundarbans, conducted over a 14-year period till 1998, made the following scientific findings on the region:

- a) The sea-level rise (SLR) had an average increase of around 3.14mm/year.
- b) The surface air-temperature rise has a correlation with the rise in sea level.
- c) Rate of coastal erosion and land loss has a correlation with sea level rise.

²⁵ See for example Arrhenius, on the influence on the carbonic acid in the air upon the temperature on the ground, *Philosophical Magazine* 41 (1896) in Roda Verheyen, *Climate Change Damage and International Law, Prevention Duties and State Responsibility*, Martinus Nijhoff Publishers Amsterdam (2005).

²⁶ See The Brundtland Report of 1987.

²⁷ See Hazra et al., *ibid*

The report from the study, which looked at coastal erosion on a number of different islands, concluded:

“From the present analysis it is apparent that sea level rise has a *dominant influence* (my emphasis) on coastal erosion. But it is also worth noting that at some places sea level rise has a strong influence on the processes leading to accretion and vice versa”²⁸.

In other words, sea level rise *has contributed* and *contributes* to island loss.

5. The Correlation between Sea-Level Rise and Global Warming

Research has certainly shown a correlation between global average temperature rise and sea level rise since the late 19th century. The IPCC Second Assessment Report published in 1995, in particular, links the rise in global mean temperature with sea-level rise, and predicts that the impacts of climate change could include *inter alia* coastal erosion, increased frequency and severity of extreme events, especially in the developing countries. Further, there has been enormous progress in the field of regional detection and attribution and scientists are more certain of the causations and predictions both on a global and regional level. The Fourth Assessment Report (Working Group one) published in 2007 finds the following²⁹:

- a) Oceans have absorbed nearly 80% of the heat *added* to the climate system and caused sea-water to expand, resulting in sea-level rise
- b) Anthropogenic temperature rise and associated sea-level rise will continue owing to time-scales associated with climate processes even if greenhouse gas emissions were stabilised.

The scientific evidence certainly tends to indicate that the rise in the earth’s mean temperature and regional temperature rises, like those studied in the Sundarbans, are contributing to the rise in sea-levels, which in turn contribute, to island loss. Although of course the IPCC’s findings are only those of one group of scientists and there will no-doubt be contrary scientific views, it is

²⁸ See Hazra et al, section on “*Correlation Study Between Sea-Level Rise and Coastal Erosion*”

²⁹ See <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf>

likely that the IPCC's findings would be given very high evidential value. This is because the IPCC is an impartial body set up by UN institutions; it looks at scientific studies including those that doubt climate change and its impacts and does not commission its own research. Thus as Roda Verheyen, states³⁰:

“... even if a small minority of so-called ‘climate change sceptics’ can still voice its own doubtful scientific opinions in the media, it would be difficult indeed in a court of law to rebut conclusions made by the IPCC with single pieces of science originating (from) one of these sceptics”.

6. The Current State Response

So what has been the Governmental response to the Sundarbans phenomenon so far? This is important not only in relation to people in the Sundarbans, but is also indicative of India's readiness to adapt to climate change impacts generally. Even in relation to sea-level rise, it is understood that increased coastal erosion and the consequent displacement of people is being seen in a number of Indian states, including Orissa and Tamil Nadu. However, the future predictions of impacts of climate change in India, as one of the top-30 countries affected³¹, include³²:

- Acute water shortage and thermal stress could cause a decline in agricultural yields, in particular rice and wheat, on which 65 percent of India's agriculture is dependent.
- Rise in temperatures may increase productivity of tropical forests with a decrease in the productivity of deciduous forests, including hardwoods such as teak.
- Agriculture in coastal areas will be most susceptible to increased sea levels through the effects of flooding and salinisation. Coastal infrastructure, tourism and oil exploration are at risk. There is also an increased risk of cyclones such as that which occurred in Orissa in 1999 killing 10000.

³⁰ Verheyen, pp 20, *ibid*

³¹ Sir Nicholas Stern, *Economics of Climate Change*, October 2006

³² <http://www.moef.gov.in/cc/index.htm>

These effects will clearly cause further human displacement, economic loss and social retardation as people leave the land that is unable to sustain them, or through *natural* disaster.

Notwithstanding the already substantial displacement of people in the Sundarbans, there appears to be little in the way of any planned programme of action to avoid future island loss. Hazra et al³³ even report that a 3520km earthen embankment made in the earlier part of the 20th Century to protect agricultural land from saline flooding has fallen into disrepair, causing a breach of the embankment during cyclones and monsoons. This has caused 950 million Rupees worth of damage to crop and forest property, affecting 0.4 million people and displacing 600 families over the past two decades.

Furthermore, in relation to rehabilitation and compensation, I was told on Sagar Island, that the displaced have been accommodated, on a “first come, first served” basis through the local panchayat (village council), with the earlier displaced persons getting more of the diminishing amount of land that is available. The West Bengal State Government has distributed reclaimed land under its power in the West Bengal Land Reforms Act 1956, which is an Act for reforming the land tenure laws in West Bengal. There is however no *specific* law or policy to rehabilitate or to compensate those displaced by the island loss. Whilst there is on-going research in relation to adaptation to climate change in India, including research into island loss in the Sundarbans³⁴, and the Government is spending money on adaptation programmes³⁵, it is unclear what legal measures are being contemplated in order to integrate climate change impacts into existing damage prevention, disaster management and compensation provisions. For instance, there is no mention of climate change impacts specifically on the National Disaster Management Authority website³⁶, nor any specific reference to the Sundarbans phenomenon, or other climate change impacts on the West Bengal website on disaster management³⁷. No official, either in West Bengal or in the Ministry of Environment was aware of any law or policy that was being

³³ See Hazra et al *ibid*.

³⁴ See India's National Communication to the UNFCCC at <http://www.natcomindia.org/>

³⁵ See for instance http://envfor.nic.in/divisions/ccd/Addressing_CC_09-10-07.pdf

³⁶ <http://ndma.gov.in/wps/portal/NDMAPortal>

³⁷ <http://www.wbgov.com/e-gov/English/Departments/DepartmentFrameNew.asp?DpId=215>

contemplated to deal with direct damage prevention or compensation for those who have sustained loss.

On a national level there is a National Environment Tribunal that was set up to provide damages for accidents occurring while handling hazardous substances, although it is unlikely that this Tribunal could be used to provide compensation to victims of climate change (also they have not been notified even after 13 years). Neither is it likely that liability under the Public Liability Insurance Act 1991 could be used to provide compensation for victims of climate change without further clarification by the Government through an order or amendment.

There have been a number of recent initiatives by Central Government. There will be a climate change policy published in June, which it is said will concentrate on three areas, international negotiations, implementation of a national action plan and research on climate change. India has proposed that the negotiation should proceed on three fronts, mitigation of climate change, adaptation to existing risks from climate change and technology transfer. The action plan to be finalised by the Prime Minister's Coordination Committee on Climate Change, will be implemented by a special cell in the Ministry of Environment and Forests (MoEF)³⁸ However, it is not known whether the initiatives will propose the necessary legal and policy changes that are necessary in order that direct damage prevention and compensation of all potential victims of climate change can be fully and properly implemented.

Any proper legal response to the issue of direct damage prevention for coastal zones and marine ecosystems, such as the Indian Sundarbans, from climate change impacts, needs to be fully integrated and coordinated into legal and planning processes. It requires both reactive and anticipatory adaptation measures³⁹. For instance the legal response to reactive adaptation measures should include legal and policy measures to mandate and promote:

- Protection of the economic infrastructure
- Public awareness to enhance protection of coastal and marine ecosystems

³⁸http://timesofindia.indiatimes.com/India/Govt_moves_to_quell_turf_war_on_climate_change_policy/articleshow/2966656.cms

³⁹ United Nations Framework Convention on Climate Change, *Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries at* http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/txt/pub_07_impacts.pdf

- Building sea walls and beach reinforcement
- Protection and conservation of coral reefs, mangroves, sea grass and littoral vegetation.

Similarly, an anticipatory adaptation mechanism would require legal measures, which provide:

- Integrated coastal zone management⁴⁰
- Better coastal planning and zoning
- Development of legislation for coastal protection
- Research and monitoring of coasts and coastal ecosystems

Notwithstanding both reactive and anticipatory measures to directly prevent climate change damage, there will continue to be some residual damage occurring. The legal framework needs to be able to provide adequate compensation through systems of designated funds or government-backed insurance schemes⁴¹.

7. International Obligations to Directly Prevent Damage (Adaptation)

The international legal framework on climate change recognises the plight of the inhabitants of small islands and low-lying coastal areas due to sea-level rise⁴², but how much does it obligate Parties to undertake measures to prevent direct damage and who is responsible for paying for it? Is there any obligation on India to implement measures to prevent island loss in the Sundarbans?

The United Nations Framework Convention on Climate Change (FCCC) 1992 ratified by India on the 1st November 1998 provides a basis for the argument. One of the founding *principles* of the FCCC states:

“3. The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or

⁴⁰ The Coastal Zone Regulation 1991 under the Environment Protection Act 1986 needs to be fully integrated with resource laws on water, land-use, forests etc.

⁴¹ which is an international obligation, see FCCC article 4.8 below

⁴² See Preamble to the FCCC and UN Resolution 44/206 of 22nd December 1989.

irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost. To achieve this, such policies and measures should take into account different socio-economic contexts, be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and comprise all economic sectors. Efforts to address climate change may be carried out cooperatively by interested Parties”⁴³.

Article 3.3 of the FCCC provides for the precautionary principle, succinctly stating that the lack of scientific certainty cannot be used to postpone action to *mitigate its adverse effects*. In the context of the Sundarbans phenomenon, it could be argued that notwithstanding the fact that there is no *conclusive* proof that climate change is contributing to island loss, adaptation policies and measures, including necessary compensation for loss should be provided for. Another point that can be made by Article 3.3 is that it contemplates that adaptation policies and measures will be necessary because of the fact that there *would be* adverse effects. Therefore, signatories have recognised that climate change impacts are a reality and that there is a need to adapt to them.

Roda Verheyen considers that Article 3.3 has “significant implications for the adaptation policies of governments”⁴⁴. She believes that Parties that foresee damage (and that of course will depend upon the evidence that is available) will be *required* to take adaptive action in order to prevent further damage. She gives the example of reducing vulnerabilities to coastal erosion and storms in certain coastal areas and considers that, the national legal system permitting, an individual should be able to rely on the precautionary principle to demand protective action, rather than waiting for residual damage to occur.

As a *Commitment* under the FCCC, the Convention provides that:

“All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances shall:

⁴³ United Nations Framework Convention on Climate Change (FCCC), Article 3.3.

⁴⁴ Roda Verheyen, page 77, *ibid*.

Formulate, *implement*, publish and regularly update national and, where appropriate, regional *programmes containing measures* to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and *measures to facilitate adequate adaptation to climate change*⁴⁵ (my emphasis).

Article 4.1(b) is clear on its face. There is a duty on all Parties to the Convention to *implement* programmes containing *measures to facilitate* adequate adaptation to climate change and directly prevent damage. There is the further obligation to report the fulfillment of this obligation under Article 12.1 of the FCCC.

Notwithstanding this obligation, it appears that only developed countries have been the most proactive in defining their adaptation needs in their national communications. However, developing countries must also undertake anticipatory, planned adaptation measures and cannot rely on adaptation by natural or human systems⁴⁶. Dr Verheyen considers that both Annex I and non-Annex I Parties (developed and developing countries) consider themselves bound by the duty established under Article 4.1(b), as evidenced by their national communications, which should and, often do, contain climate change adaptation action plans.

Two of the terms within Article 4.1(b) need some further clarification. “Measures to facilitate” should be given a literal meaning to “help, aid or assist”, but should not be restricted to that. Once again it is considered that the measures can include the full range of measures that would enable “adequate adaptation”, including both interventions in health, education or housing sectors, as much as “hard” adaptation measures such as the building of dikes, or the planting of trees in coastal areas to soften the impacts of tidal waves⁴⁷. “Adequate” adaptation is not defined by the FCCC and allows for a whole range of measures to be adopted whilst not obliging Parties to carry out any particular kind or type of measure. The provision also does not specify the time

⁴⁵ FCCC, Article 4(1)(b).

⁴⁶ See Roda Verheyen, pp85, *ibid*.

⁴⁷ Verheyen, pp86, *ibid*, which is supported by Article 4.1(e) which states that Parties shall :”*cooperate in preparing for adaptation to the impact of climate change develop and elaborate...plans for coastal zone management, water resources and agriculture, and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods*” which does not contain any positive requirement in contrast to Article 4.1(b).

period in which the duty arises, nor does it set a deadline for either the formulation of the adaptation programmes or their implementation. However adaptation measures that breach other international or national rules could be deemed inadequate.

In the context of the Sundarbans phenomenon, the current paucity of adaptation measures is likely to breach India's obligations under the 1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage, which contains binding protection obligations in relation to specific sites for the benefit of the "world heritage of mankind as a whole" and thus make them also inadequate in relation to climate change law.

The FCCC also provides that all Parties shall:

"Cooperate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management, water resources and agriculture and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods"⁴⁸.

Of course adaptation measures should only be undertaken after a full assessment of a particular region's or community's vulnerability to climate change which should also focus on factors highlighted to assist countries including, the degree of economic efficiency, environmental sustainability, technical feasibility, administrative/legal admissibility, and the social acceptability of the measures⁴⁹. The term therefore leaves a degree of discretion to the State Party to choose between preventing residual damage and accepting it.

However, the Sundarbans' islanders, notwithstanding the fact that the FCCC cannot be enforced domestically⁵⁰, could mount a strong argument that India is currently in breach of its international obligations to have adequate measures to combat the island loss.

⁴⁸ FCCC Article 4.1(e)

⁴⁹ . See Klein/Tol, *Adaptation to Climate Change: Options and Technologies*, Technical Paper FCCC/TP/1997/3. See also UNDP Adaptation Policy Framework (<http://www.undp.org>) which seeks to assist in making such choices.

⁵⁰ There is currently not legislation giving effect to the FCCC are required under Article 253 of the Constitution of India.

8. The Costs of Adaptation

The major issue in direct damage prevention in developing countries is who should pay for it. Adaptation to the climate change impacts is going to cost a huge amount of resources. By 2030 the adaptation funds required were estimated at: USD 14 billion for agriculture, forestry and fisheries; USD 11 billion for water resources; USD 5 billion for human health; USD 11 billion for coastal zones; and USD 8 –130 billion for infrastructure. In summary, the UNFCCC secretariat estimated that the investment and financial flows needed for adaptation are likely to be tens of billions of dollars per year several decades from now and could be more than USD 100 billion per year.⁵¹

The FCCC recognises both that the global nature of the problem calls for “widest possible cooperation” between countries and that the response should be in accordance with their “common but differentiated responsibilities”, their respective capabilities and their social and economic conditions⁵². The Convention however contains specific provisions that deal with how the international community should deal with the funding of adaptation in developing countries.

Article 4.8 states that Parties....shall:

“give full consideration to what actions are necessary under the FCCC, including action related to funding insurance and the transfer of technology, to meet the specific needs and concerns of developing countries Parties arising from the adverse effects of climate change and/of the implementation of response measures especially on:

- (a) Small island countries;
- (b) Countries with low-lying coastal areas;
- (c) Countries with arid and semi-arid areas, forested areas and areas liable to forest decay;
- (d) Countries with areas prone to natural disasters;
- (e) Countries with areas liable to drought and desertification;

⁵¹ United Nations Framework Convention on Climate Change, *Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries*, pp.40, *ibid*

⁵² See Preamble to FCCC.

- (f) Countries with areas of high urban atmospheric pollution;
- (g) Countries with areas with fragile ecosystems, including mountainous ecosystems;
- (h) Countries whose economies are highly dependent on income generated from the production, processing and export, and/or on consumption of fossil fuels and associated energy-intensive products; and
- (i) Landlocked and transit countries”.

Further Article 4.9 states the Parties... shall:

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

The considered view is that Article 4.8 includes direct damage prevention schemes and funding insurance for consequent damage, such as island loss, as evidenced through the discussion held in the International Negotiation Committee of the FCCC about insurance schemes for residual damage⁵³. “Concerns” can include both the financial and technological needs for adaptation to prevent damage to property, territory and life and the financial and technological needs for addressing climate change induced damage that cannot be prevented through adaptation measures⁵⁴.

The FCCC also provides for certain financial commitments and mechanisms for direct damage prevention.:

“The developed country Parties and other developed Parties included in Annex II shall provide *new and additional financial resources* (my addition) to meet the agreed *full costs* incurred by developing country Parties in complying with their obligations under Article 12, paragraph

⁵³ Decision 5/CP.7 (FCCC/CP/2001/13/Add.1) took up this mandate and asked the Secretariat to hold workshops on how to progress on the issue of insurance. Two workshops on this issue were held in May 2003, one on insurance and risk assessment in the context of climate change and extreme weather events, the other on insurance-related action to address the needs of developing country Parties arising from the adverse effects of climate change and from the impact of the implementation of response measures. See Linneroth-Bayer/Mace/Verheyen, Insurance-Related Actions and Risk Assessment in the Context of the FCCC, Background Paper, May 2003 and FCC/SBI/2003/11. Report on the FCCC workshops on insurance. Recorded in Verheyen, page 89.

⁵⁴ Roda Verheyen, pp 89, Ibid

1(communucation of information, my addition). *They shall also provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of implementing measures that are covered by paragraph 1 of this Article and that are agreed between a developing country Party and the international entity or entities referred to in Article 11, in accordance with that Article* (my addition). The implementation of these commitments shall take into account the need for adequacy and predictability in the flow of funds and the importance of appropriate burden sharing among the developed country Parties”⁵⁵.

In other words there is a financial obligation for developed country Parties to *inter alia* provide financial resources to fund the adaptation measures in Article 4.1(b) and cooperation in preparation for adaptation measures in 4.1 (e).

Additionally, Article 4.4 states that:

“The developed country Parties and other developed Parties included in Annex II shall also assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects”.

It is considered that this provides an unlimited basis for adaptation and the most costly provision in the Convention itself. Professor P Sands has commented that Article 4.4 “amounts to an implicit acceptance of the responsibility for causing climate change”⁵⁶. It is further asserted that the financial obligations in 4.3 and 4.4 are mandatory and differ substantially from other voluntary assistance. Correspondingly, the climate regime, uniquely provides developing countries with a legal basis to claim funds from developed countries for the purposes defined in the FCCC and in particular for dealing with climate change damage⁵⁷. The ‘linking clause’ also

⁵⁵ FCCC Article 4.3

⁵⁶ Sands, *The United Nations Framework Convention on Climate Change*, 1 RECIEL (1992) as quoted in Verheyen, pp 92.

⁵⁷ During the negotiations of the FCCC, developing countries emphasised that the implementation of any obligations by them, including the duty to implement adaptation measures, would depend on new financial commitments by the developed countries.

seems to indicate that developing countries should or could only undertake adaptation measures when developed countries have provided the means to do so:

“The extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties”⁵⁸.

So what are the exact legal obligations contained in Articles 4.3 and 4.4 of the FCCC? The concept contained in Article 4 that the developed countries should fund only the “incremental costs of measures” is somewhat problematic. Incremental costs are not defined but clearly apply one of the underlying principles of the Convention that only adaptation costs to *climate change damage* should be met. So in relation to the Sundarbans phenomenon, where human-induced sea-level rise is only a *contributor* to island loss, how would it be possible to clearly calculate how much of the direct damage prevention costs would be attributable to climate change and those attributable to natural climate variability? How much of the cost of a sea wall on southern Sagar Island would have to be borne by the developed countries?

Another problem is that the text of Article 4.3 implies that financial entitlements for adaptation purposes are to be determined by the real needs of developing countries on an agreed basis. This is seemingly confirmed by paragraph 5 of the MoU⁵⁹ concluded between the Conference of Parties and the Global Environmental Facility (GEF), which is the Convention’s Financial Mechanism, which states: “funding decisions for specific projects should be agreed between the developing country Party concerned and the GEF in conformity with policy guidance from the COP”. Therefore, if the GEF rejects a project the developed country parties need not provide any

⁵⁸ FCCC, Article 4.7

⁵⁹ Para 5 of the MoU: “If any Party considers that a decision of the Council regarding a specific project in criteria established by the COP in the context of the Convention, the COP should analyse the observations presented to it by the Party and take decisions on the basis of the compliance with such policies, programmer priorities and eligibility criteria. In the event that the COP considers that this specific project decision does not comply with the policies, programme priorities, and the eligibility criteria established by the COP, it may ask the Council of the GEF for further clarification on the specific project decision and in due time may ask for a reconsideration of that decision”.

funding. This considerably weakens the commitment under Article 4.3 that does not provide developing countries with a direct claim for adaptation funds from developed countries.

Article 4.4 is perhaps a less problematic route to obtaining financial resources for damage prevention from developed countries. There is no specific reference to any agreement or to incremental costs; however, the Convention does not provide any definition to the phrase “particularly vulnerable”. A number of vulnerability factors have been identified under Article 4.8, including “countries with low-lying coastal” regions mentioned in the Preamble to the Convention, but this would include almost all developing countries. This lack of clarity has led Parties to agree that it is necessary to identify particularly vulnerable Parties in order to implement Article 4.4⁶⁰. It is understood that no such list has been made which leaves open the question as to which developing country Parties are “particularly vulnerable” under the Convention.

Article 4.4 also somewhat muddies the waters through the use of the term “assist in meeting the costs”. It is unclear about the extent of the funding to be provided and the phrase itself seems to imply that not all the costs should be from developed country Parties. “Assist” could be any support provided, even on a very small scale relative to the total cost of the activity. Article 4.4 has not been discussed extensively, so the Parties have offered no clear views. However, on a proper interpretation of the Article it must be the needs of the countries, rather than the willingness of developed country Parties to pay for adaptation needs which are paramount. Also Article 4.4 has to be contrasted with Article 4.3 where only the adaptation needs or proportion of costs arising *from climate change* could be obtained. There is therefore a strong argument that the international legal obligations require developed countries to provide funds to prevent island loss in the Sundarbans and to assist in creating a legal framework that could meet the adaptation needs.

⁶⁰ Report of COP1, FCCC/CP/1995/Add.1, para 1(d)

9. The International Climate Change Funds

So what funds could be made available to the inhabitants, say of Sagar Island, and how accessible are these? Pursuant to Article 21.3 FCCC and certain decisions of the COP, funding under the FCCC is provided by its financial mechanism the GEF as mentioned above. The GEF was established as a joint project of United Nations Environment Program (UNEP), United Nations Development Programme, and the World Bank in 1991⁶¹ to address the financial needs to fight biodiversity loss, climate change, degradation of international waters and ozone depletion-the four focal areas⁶². Developing countries were concerned about the attachment of the GEF to the World Bank (and consequently the United States as its major contributor), and correspondingly Article 11 FCCC was added which defines a “financial mechanism” for the provision of financial resources on a “grant or concessional basis” for the implementation of the FCCC. It further stipulates that the mechanism will function under the “guidance” of, and be accountable to, the COP. This guidance is limited in scope to “policies, programmes priorities and eligibility criteria” and does not extend to specific funding decisions”.

The GEF has an operational strategy, upon which all its decisions are based⁶³. It states that, *inter alia*, the projects financed or co-financed by the GEF shall result in “global benefits”. According to the strategy, such benefits are obtained whenever a global environmental objective is met. In the context of funding for direct damage prevention this is problematic as, by definition such action usually benefits only the region or country in which the measures are undertaken. Consequently, the GEF’s projects have been focused on mitigation measures, in particular on renewable energy and energy efficiency, which through greenhouse gas reduction will have a clear global environmental benefit. This is clearly a major, and in the author’s views, an unwarranted funding criteria. The purpose of the funding is surely to ensure that there is some distributive justice from those who are responsible for the problem to those who are victims, and

⁶¹ Dec. 12/CP.2, FCCC/CP/1996/15/Add.1, 55. The COP designated the GEF as an operating entity of the financial mechanism on an on-going basis, subject to review every four years at COP 4 (3/CP/4, FCCC/CP/1008/16/Add.1).

⁶² For more detail, see GEF Report on the Development of a Climate Change Strategy, FCCC/CP/1995/4; Report of the Global Environment Facility to COP2, FCCC/CP/1996/8; GEF Report to COP4, FCCC/CP/1998/12; GEF Report to COP5, FCC/CP./1999/3; GEF Report to COP 6, FCCC/CP/2000/3 and FCCC/CP/2000/3/Add.1; GEF report to COP7, FCCC/CP/2001/8; GEF Report to COP8, FCCC/CP/2002/4; GEF Report to COP9, FCCC/CP/2003/3 and GEF Report to COP 10, FCCC/CP/2004/6.

⁶³ Global Environment facility, Operational Strategy, February 1996 at [Http://gefweb.org](http://gefweb.org).

correspondingly there should be no need to make an assessment of the global environmental benefit of the measures to be taken. However, in the context of the Sundarbans meeting the “global benefit” criteria should not present a difficulty, owing to the area’s status as an World Heritage Site and therefore of global environmental importance (see above).

The GEF has operationalised funding in three stages. Stage I provides support for the national communications process, a portion of which is the vulnerability and adaptation assessment. Stage II provides further assistance for other capacity-building efforts for adaptation. Stage III refers to support for actual adaptation activities, including insurance.

The GEF currently operates a number of separate funds for adaptation measures:

- Least Developed Country Fund (LDCF)⁶⁴.
- Strategic Priority on Adaptation (SPA)⁶⁵.
- Special Climate Change Fund (SCCF)⁶⁶.

Another fund, the Adaptation Fund⁶⁷, has been receiving money for several years but has not been operationalised because of disagreements on who should manage it. Developing countries did not want the GEF governing the Fund, owing to the limited funding criteria and the Fund’s potential size. At Bali, however, it was decided, due to pressure from developing countries, that the Fund should be independent of the GEF with its own representative governing Board and

⁶⁴ (LDCF) is a development-focused fund. It supports the poorest countries, which are most vulnerable to climate change impacts (India is not one). The fund provides support to [LDCs](#) as they prepare [National Adaptation Programmes of Action \(NAPA\)](#) in which they identify their most urgent adaptation needs. Following their completion, additional funds will be made available to assist LDCs to implement the NAPAs, probably through expedited, medium-sized projects up to US\$ 1.5 million. This fund became operational in July 2001.

⁶⁵ SPA is an ecosystem/focal area focused fund. The goal is to ensure that climate change concerns are incorporated in the management of ecosystems through GEF focal area projects. It will pilot demonstration projects concerned with the management of ecosystems to show how climate change adaptation planning and assessment can be practically integrated into national policy and sustainable development planning. This fund became operational in July 2004. The SPA is a pilot programme of US\$ 50 million which will be evaluated by the GEF before additional funds are allocated. (*View Council Document: [Oct. 2005](#)*)

⁶⁶ (SCCF) is also a development-focused fund concerned primarily with activities, programmes and measures in the development sectors most affected by climate change. Areas of support include adaptation in agriculture, water resources management, health, disaster-risk management and coastal zone management. This fund became operational in October 2005

⁶⁷ The Adaptation Fund is not active as yet and is not expected to generate significant resources until at least 2010. Therefore the primary focus of this website is programming for the SPA, LDCF, and SCCF

eventually its own Secretariat⁶⁸. This is a major step forward in trying to ensure justice in climate change.

The majority of the climate change funds under international law are therefore mainly intended to promote capacity building into adaptation planning, pilot projects, and programmes in the least developed countries. The Sundarbans islanders could potentially use the Adaptation Fund to fund concrete direct damage prevention schemes⁶⁹. There are also a number of other international funds which could be used for the assessment of climate change risks, technology transfer, or emergency response⁷⁰.

On a global level there is large disparity between the needs as identified by the FCCC and the resources for adaptation available from the international funds. For instance the amount of money available in the existing funds amounts to USD 275 million as of August 2007. The Adaptation Fund could receive USD 80-300 million for each year of the first commitment period (2008-2012)⁷¹. This indicates a serious shortfall in funding for direct damage prevention for developing countries and indicates that they will need to look at other methods of funding direct damage prevention from, other revenue⁷², or from other multilateral environmental treaties. In the Sundarbans context, particularly in relation to its environmental importance, India could rely on the United Nations Law of the Sea Convention (UNCLOS)⁷³; Convention Concerning the

⁶⁸ See “Major news from Bali climate conference: Victory for the vulnerable with decision on climate-change adaptation fund”, International Institute for Environment and Development, 11th December 2007 at: <http://www.iied.org/mediaroom/releases/071211Bali.html>

⁶⁹ Information on how these funds, including the Adaption Fund can be accessed can be found at: https://login.undp.org/smforms/login.fcc?TYPE=33554433&REALMOID=06-a027ebb1-44a7-1001-b928-834f91350000&GUID=&SMAUTHREASON=0&METHOD=GET&SMAGENTNAME=-SM-jDTUZ2FVzvXrzyCydSJv9prWLP2lnkltQLZ2j6P1qwpfBXzbx%2be8issJKubopr mw&TARGET=-SM-http%3a%2f%2fintra%2eundp%2eorg%2fgef%2fadaptation%2fanxes%2f07_PDG_v2a%2html

⁷⁰ Dr Benito Muller, Director Oxford Climate Change Policy UK, *Sources and Mechanisms for Financing Adaptation*, 25th-26th February 2008, page 6, at: http://209.85.175.104/search?q=cache:YkSst3OzdJcJ:www.teriin.org/events/docs/adma_presentation/2benito.pdf+adaptation+fund+and+governance&hl=en&ct=clnk&cd=6&gl=in

⁷¹ . The Adaptation Fund is funded by a 2% levy on the Clean Development Mechanism of the Kyoto Protocol. See United Nations Framework Convention on Climate Change, *Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries*, pp. 38, *ibid*

⁷² Muller 2008, *ibid*

⁷³ Island loss could lead to substantial losses of maritime zones and corresponding sovereign rights (Article 6). The use of customary international law could be used to gain compensation.

Protection of the World Cultural and Natural Heritage (UNESCO)⁷⁴; and Convention on Biological Diversity⁷⁵ amongst others.

The Bali Action Plan arising out of the Bali Conference recognises the need to have “enhanced action on adaptation”, including *inter alia*: “disaster reduction strategies and means to address loss and damage associated with climate change impacts in developing countries that are particularly vulnerable to the adverse effects of climate change”⁷⁶. The Plan also requires “enhanced action on the provision of financial resources to support action on. adaptation and technology cooperation”. This is a step forward and it is hoped that it will engender new or better legal instruments to resource adaptation measures.

10. Conclusion

The phenomenon of island loss in the Indian Sundarbans represents only the tip of the iceberg (no pun intended) in relation to damage through climate change impacts, but like the dew drop on a leaf reflects the much wider issues of climate change surrounding it. Climate change will inevitably affect hundreds of millions of the most vulnerable people on our planet. Those like the Sundarbans islanders who have least contributed to the problem will be most affected by its hungry tide. The case shows that the world has not yet fully woken up to the reality that it is facing. The scientific basis of climate change, and even its most subtle impacts, are not completely understood or accepted at the highest level. The *business as usual* attitude permeates into the lack of concrete action on the international, national and regional level notwithstanding certain legal obligations to do so.

Environmental refugees, those who will face displacement though land loss, water shortage, or flooding due to global warming, like their Refugee Convention counterparts⁷⁷, require a global humanitarian response. Adequate adaptation and reparation for victims of residual damage cannot be left to the individual actions of state-actors or communities to take action for breaches

⁷⁴ Through a request for financial assistance with the World Heritage Committee (Article 13.1).

⁷⁵ Through use of its no-harm rule (Article 3)

⁷⁶ See 1(c)(3)

⁷⁷ Convention Relating to the Status of Refugees 1951.

of international public or private law⁷⁸. A proper international legal framework must exist for the recognition of actual or potential damage attributable to climate change; State Parties must fulfill their “*common, but differentiated responsibility*” through providing sufficient resources through national taxation schemes for the heaviest polluters if need be; and receiving States must ensure that there are legal mechanisms in place for both reactive and anticipatory adaptation measures.

One such suggestion on a national level is a Climate Change Security Act. The Act should mandate all relevant ministries and institutions to have nodal officials who are concerned with looking at climate change needs from the prospective of their ministry and be involved with planning and creating implementing policies and action plans. There should be a full study of India’s vulnerabilities and adaptation needs. This should include analysing impacts on water resources, agriculture, biodiversity, ecosystems and human health. Anticipatory actions should be contemplated in all development programmes and the Act should ensure that the legal measures for both reactive and anticipatory adaptation needs are integrated into all relevant natural resource laws.

The noise around publicising and campaigning on issues can often drown out the quiet footfalls, which illuminate an issue and reveal its full form. The footfall of the Sundarbans needs to be heard, the hungry tide awaits.

⁷⁸ A section on litigation is For more information on litigation, see Roda Verheyen *ibid* and Anita M Halvorssen, *Implementing the Climate Regime: International Compliance, (Book Review)*, 17 Colorado Journal of International Environmental Law and Policy 1 (2005-6).
Ken Alex, *A Period of Consequences: Global Warming as a Public Nuisance*, 43 Stanford Journal of International Law 77(2007).
Elizabeth E Hancock, *Red Dawn, Blue Thunder, Purple Rain: Corporate Risk Liability for Global Climate Change and the Sec Disclosure Dilemma*, 17 Geo International Environmental Law 233 (2004-2005).
Combating the Impacts of Global Warming: A Novel Legal Strategy, 13 Colorado Journal of Environmental Law and Policy 171 (2002).