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**CLIMATE CHANGE**

**AN OVERVIEW**

**Paper prepared by the Secretariat of the United Nations Permanent Forum on Indigenous Issues**

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**1. Introduction:**

This paper seeks to outline the myriad of issues around Climate Change and to provide an analysis of the threats and challenges faced by indigenous peoples, UN agencies and others. The conclusion sets out a number of recommendations that the United nations Permanent Forum on Indigenous Issues (UNPFII) might wish to consider at the seventh session of the UNPFII (21 April – 2 May 2008).

The UN Permanent Forum is an advisory body to the Economic and Social Council and part of its responsibility is to raise awareness and promote the integration and coordination of activities related to indigenous issues within the UN system. Hence, the UN Permanent Forum is well placed to support indigenous peoples’ in providing a ‘human face’ to the issues regarding climate change and its environmental threats and challenges.

Climate change is a major issue for indigenous peoples around the world so it is no coincidence that the special theme for the seventh session of the UN Permanent Forum on Indigenous Issues is “*Climate change, bio-cultural diversity and livelihoods: the stewardship role of indigenous peoples and new challenges*”.

Climate change is considered to be a critical global challenge and recent events have demonstrated the world’s growing vulnerability to climate change. The impacts of climate change range from affecting agriculture to further endangering food security, to rising sea-levels and the accelerated erosion of coastal zones, increasing intensity of natural disasters, species extinction and the spread of vector-borne diseases.

Climate change is about the growth of greenhouse gas emissions due to the burning of fossil fuels, resulting mainly from industrial activities and motor transportation, hence there is a build up of the carbon dioxide levels in the atmosphere.  The carbon dioxide build up is made worse by the increasing loss of forests, which act as “carbon sinks” that absorb gases and prevent its release into the atmosphere. Further, the increase of carbon dioxide and other gases in the atmosphere also enhances the “Greenhouse Effect” (in which more heat is generated), thus leading to temperatures rising.  Based on data  from the UN’s Intergovernmental Panel on Climate Change, it is estimated that the mean global surface temperature has increased by about 0.3 to 0.6 degree Celsius since the late 19th century to the present, and an increase of 0.2 to 0.3 degree over the last 40 years.  A significant rise in temperature can trigger several events, such as melting of the ice sheets, the death of some significant marine life and other biodiversity, and effects on agriculture and human health.

In his address to the High Level Event on Climate Change on 24 September 2007, Mr Ban Ki Moon, the Secretary General of the United Nations, stated “I am convinced that climate change, and what we do about it, will define us, our era, and ultimately the global legacy we leave for future generations. Today, the time for doubt has passed. The United Nations Intergovernmental Panel on Climate Change has unequivocally affirmed the warming of our climate system, and linked it directly to human activity”. He also stated in the same address “Today, the effects of climate change are being felt around the world. But they are being felt most by those who are the least able to cope. Indeed, the terrible irony for many developing countries is that, though they have contributed the least to the process of climate change, they are the ones most at risk from its consequences. For some island States and peoples this is a matter of survival. The moral imperative could not be clearer”. While not being specific, the Secretary General’s statement could very well have been made about indigenous peoples because they are the ones who will bear the brunt of the consequences of climate change eventhough they have contributed the very least to greenhouse emissions.[[1]](#footnote-1)

Concerns regarding the impact of climate change on indigenous communities, their traditional knowledge and related biological diversity was also expressed at the annual meeting of the Interagency Support Group on Indigenous Issues (IASG) in Montreal in September 2007. The IASG highlighted the fact “that indigenous peoples are often among the world's most marginalized and impoverished peoples and will bear the brunt of the catastrophe of climate change and as such provide a human face to the climate change crises”. They pointed out that “the most advanced scientific research has concluded that changes in climate will gravely harm the health of indigenous peoples traditional lands and waters and that many of plants and animals upon which they depend for survival will be threatened by the immediate impacts of climate change. It was felt that such conclusions require urgent and unprecedented efforts and interventions from the global community”.[[2]](#footnote-2)

Despite the fact that these changes are impacting intensely on indigenous peoples and their communities, they are very rarely considered in public discourses on climate change. Indigenous peoples are vital to, and active in, the many ecosystems that inhabit their lands and territories and are therefore, in a position to help enhance the resilience of these ecosystems. In addition, indigenous peoples interpret and react to climate change impacts in creative ways, drawing on traditional knowledge and other technologies to find solutions, which may help society at large to cope with impending changes.[[3]](#footnote-3)

In many instances, high level meetings and various reports on climate change make only scarce mention of indigenous peoples, and then only in certain regions and as helpless victims of changes beyond their control. Hence, there is a need to shift the focus so that indigenous peoples are primary actors within global climate change monitoring, adaptation and innovation. Indigenous peoples must have a voice in policy formation and action in the same way they do in other relevant UN processes such as the UN Permanent Forum on Indigenous Issues, the Convention on Biological Diversity, the World Intellectual Property Organization, the Human Rights Council and, to some extent, the United Nations Framework Convention on Climate Change and others.

The inclusion of indigenous peoples’ voices in issues affecting them is an important issue in regards to the ongoing debates around climate change. The right to participate in decision-making is confirmed in the Declaration on the Rights of Indigenous Peoples and Agenda 21. Article 18 of the Declaration on the Rights of Indigenous Peoples states that “Indigenous peoples have the right to participate in decision-making in matters which would affect their rights, through representatives chosen by themselves in accordance with their own procedures, as well as to maintain and develop their own indigenous decision-making institutions”.[[4]](#footnote-4) Chapter 26 in Agenda 21 is devoted solely to *Recognizing And Strengthening The Role Of Indigenous People And Their Communities* and includes a number of references about recognizing indigenous peoples as a major group with a right to participate at all national and international policy and implementation meetings in regards to sustainable development and other program areas of Agenda 21.[[5]](#footnote-5)

**2. Effects of Climate Change:**

Below is a brief overview of the effects of climate change which are listed according to the UNPFII’s seven indigenous regions:

**(i) Africa**

One of the major areas to be affected by climate change in Africa is the Kalahari Desert. There are 2.5 million kilometres of dunes in southern Africa which are covered in vegetation and used for grazing. However the rise in temperatures and the expected dune expansion along with increased wind speeds will result in the region loosing most of its vegetation cover and hence, becoming less feasible for indigenous peoples living in the region. As their traditional resource base diminishes, the traditional practices of cattle and goat farming will no longer survive. There are already areas where indigenous peoples are forced to live around government drilled bores for water and depend on government support for their survival. Food security is a major issue for indigenous peoples residing in the deserts and they are on the frontline of global climate change.[[6]](#footnote-6)

**(ii) Asia**

In the tropical rainforests of Asia, temperatures are expected to rise 2-8 degree Celcius and further climatic variation will include decrease in rainfall, crop failures and forest fires. Tropical rainforests are the haven for biodiversity, as well as indigenous peoples’ cultural diversity and forest fires will threaten this heritage of biodiversity.[[7]](#footnote-7)

People in low-lying areas of Bangladesh could be displaced by a one-meter rise in sea levels. Such a rise could also threaten the coastal zones of Japan and China. The impact will mean that salt water could intrude on inland rivers, threatening some supplies of fresh water.

In the high altitude regions of the Himalayans, there are glacial melts which effect hundreds of millions of rural dwellers who depend on the seasonal flow of water; there might be more water in the short term, but less in the long run as glaciers and snow cover shrink. The warming of the high altitude regions are likely to mean that population growth, settlement expansion and encroachment are likely to become a major management challenge and these external influences are likely to have an impact on indigenous peoples and their lands. [[8]](#footnote-8)

The poor, many of whom are indigenous peoples, are highly vulnerable to climate change in urban areas because of their limited access to profitable livelihood opportunities and limited access to areas that are fit for safe and healthy habitation. Consequently, the poor sector will be exposed to more risks from floods and other climate related hazards in areas where they are forced to live.[[9]](#footnote-9)

**(iii) Central and South America and the Caribbean**

This region is very diverse from the Chilean deserts to the tropical rainforests of Brazil and Ecuador to high altitudes of the Peruvian Andes.

Like elsewhere in the world, indigenous peoples’ use of biodiversity is central to environmental management and livelihoods. In the Andes, alpine warming and deforestation will threaten indigenous peoples’ access to plants and tuba crops for food, medicine, grazing animals and hunting. Once these food crops are replaced by trees that will grow in the region, indigenous peoples will be deprived of important traditional resources which are central to their livelihoods.

The warming of the earth’s surface is forcing indigenous peoples in this region to farm at higher altitudes to grow their staple crops which adds to further deforestation. Not only does this affect the water sources and leads to soil erosion, it also has a cultural impact. The displacement of Andean cultures to higher lands means the loss of the places where their culture is rooted, putting its survival at risk. Indigenous communities in the Imbakucha Basin in Otavalo in Ecuador, the unexpected frosts and long drought periods affect all farming activities. The older generation say they no longer know when to sow because the rains do not come as expected. Migration offers one way out but represents a cultural nemesis and the human and social price to pay is high.[[10]](#footnote-10)

In the Amazon, the effects of climate change will include deforestation and forest fragmentation and as a result there will be more carbon released into the atmosphere exacerbating and creating further changes. The droughts of 2005 resulted in fires in the western Amazon region and this is likely to occur again as rainforest is replaced by savannas thus, having a huge affect of the livelihoods of the indigenous peoples in the region.[[11]](#footnote-11)

Many communities in the Caribbean are in coastal locations which are often the centre of government activities, ports and international airports, hence there is dependence on coastal resources for subsistence living. As a result there is rapid and unplanned movements of rural and outer island residents to the major centers. This puts enormous pressures on urban resources to meet the most basic needs and hence creates social and economic stresses and vulnerability to hazardous weather conditions such as cyclones and diseases. Also in the Caribbean, the relationship between climate change and water security will be a major issue as access to safe water already eludes the populations of several Caribbean countries which are dependant on rainfall and groundwater. At the same time, pollution of ground water is a major problem, especially for low-lying islands. Poor water quality affects human health and carries water-borne diseases.[[12]](#footnote-12)

**(iv) Arctic**

The polar regions are now experiencing some of the most rapid and severe climate change on earth, which contribute to environmental and socio-economic changes. Indigenous peoples, their culture and the whole ecosystem that they interact with is very much dependent on the cold and the extreme physical conditions of the Arctic region. Indigenous peoples depend on hunting for polar bears, walrus, seals and caribou, herding reindeer, fishing and gathering not only for food to support the local economy, but also as the basis for their cultural and social identity. Some of the concerns facing indigenous peoples include the change in species and availability of traditional food sources, perceived reduction in weather predictions and the safety of travelling in changing ice and weather conditions. All these provide serious challenges to human health and food security.[[13]](#footnote-13)

According to indigenous peoples, the Arctic is becoming an environment at risk because the sea ice is less stable, unusual weather patterns are occurring, vegetation cover is changing, and particular animals are no longer found in traditional hunting areas during specific seasons. Local landscapes, seascapes and icescapes are becoming unfamiliar, making peoples feel like strangers in their own land.[[14]](#footnote-14)

Peoples across the Arctic region report changes in the timing, length and character of the seasons including more rain in autumn and winter and more extreme heat in summer. In several indigenous villages in Alaska, entire communities may have to relocate because of erosion due to the thawing of permafrost and large waves slamming against the west and northern shores. Coastal indigenous communities are severely threatened by storm related erosion because of melting sea ice. Hence, up to 80% of Alaskan communities, comprised mainly of indigenous peoples, are vulnerable to either coastal or river erosion.[[15]](#footnote-15)

In Nunavut the elders can longer predict the weather using their traditional knowledge because the weather has become so unpredictable and extreme. Due to drop in water levels, indigenous hunters are no longer able to travel by boats to caribou hunting grounds because of shallow waters. Hence, many important summer hunting grounds cannot be reached. Storage of traditional foods for the winter months is also a major issue for indigenous peoples in the region, especially in the Northwest Territories due to warmer weather. For example, drying and smoking foods is more difficult because the food is pre-cooked in the summer heat.[[16]](#footnote-16)

In Finland, Norway and Sweden, rain and mild weather during the winter season often prevents reindeer from accessing lichen, which is a vital food source. This has caused massive loss of reindeers. For Saami communities, reindeers are vital to their culture, subsistence and economy. This has forced many reindeer herders to feed their herds with fodder which is expensive and not economically viable in the long term.[[17]](#footnote-17)

**(v) Central and Eastern Europe, Russian Federation, Central Asia and Transcaucasia**

Like the polar regions, Siberia and the far north-east are now experiencing some of the most rapid and severe climate change on earth, which contribute to environmental and socio-economic changes. The survival of indigenous peoples, who depend on fishing, hunting and agriculture, also depends on the success of their fragile environment and its resources.  As bears and other wild game disappear, the local villages and the people that live in them will suffer particular hardships.  Worse, unique indigenous cultures, traditions and languages will face major challenges in maintaining their diversity.

Indigenous peoples have noticed the arrival of new species of plants which were never seen in the region previously. There is a view the hotter summers have provided the conditions for the new plants to thrive in rivers and lakes where the small flowered duckweed. This had made it difficult for fish hence, people’s fishing opportunities have declined due to closure of lakes because of the new plant growth. Also, new bird species have arrived and birds now stay longer in the villages than previously.[[18]](#footnote-18)

Changes in migration and foraging patterns of reindeer herds, sparked by fluctuating weather patterns, will also cause problems for many northern communities.  Those who depend on hunting walrus will bear the brunt of melting ice caps and glaciers. One of the main observations in the region has been the changing seasonal weather patterns, the increased unpredictability and instability of the weather, as well as shorter winters and the fall–winter transition is occurring later and spring weather arriving earlier.[[19]](#footnote-19)

**(vi) North America**

Climate change is likely to have a major impact on indigenous peoples and their communities that are dependent on natural resources. About 1.2 million tribal members live on or near reservations, and many pursue lifestyles with a mix of traditional subsistence activities and wage labour. Many reservation economies and budgets of indigenous governments depend heavily on agriculture, forest products and tourism.[[20]](#footnote-20)

Due to global warming there will be less snowfall and more droughts in many parts of North America which will have a significant impact on indigenous peoples. For example,water resources and water quality may decrease with less precipitation. Further, extended heat waves will increase evaporation and deplete the underground water resources. There may be impacts on health, plant cover, wildlife populations, tribal water rights and individual agricultural operations, and a reduction of tribal services due to decrease in income from land leases.[[21]](#footnote-21)

Natural disasters such asblizzards, ice storms, and floods, electric power outages, lack oftransportation, fuel depletion and food supply shortages will isolate indigenous communities.Poor housing conditions and high energy costs as well as limited access to off-reservation emergencyassistance will contribute to the risks faced by indigenous peoples. Also, livestock loss due to severe blizzards can force tribal ranchers out of business due to lack of financial resources. Tribal governments are dependent on lease income for their operations. With extreme weather events, the risk of land transfer to non-tribal use and ownership will increase.[[22]](#footnote-22)

Higher temperatures over extended periods will result in the loss of native grass and medicinal plants, and erosion that allows the invasion of non-native plants. The zones of semi-arid and desert shrubs, cactus, and sagebrush will move northward. Finally, fire frequency could also increase with more fuel and lightning strikes, degrading the land and reducing regional bio-diversity.[[23]](#footnote-23)

**(vii) Pacific**

Most of the Pacific region comprises small island states and are affected by rising sea levels due to climate change. Environmental changes are prominent on islands where volcanoes build and erode; coral atolls submerge and reappear and the islands’ biodiversity is in flux. The region has suffered extensively from humankind disasters such as nuclear testing, pollution including shipping-related pollution, hazardous chemicals and hazardous wastes (Persistent Organic Pollutants or POPs), and solid waste management and disposals. These issues as well as the threats of climate change have severely affected the ability of island ecosystems to maintain a healthy and pristine environment for the enjoyment of indigenous peoples.[[24]](#footnote-24)

The effects of climate change have included high tides which flood causeways linking villages, forcing cars, buses and trucks to drive through seawater. This has been particularly noticeable in Kiribati and a number of other small Pacific island nations that could drown during this century. High tides and stormy seas have also caused problems recently in the Marshall Islands, Cook Island, Tuvalu and low-lying islands of Papua New Guinea (PNG).

Migration will become a major issue as flooding (due to rise in sea level) forces families to move from their homes. For example, the people living in PNG’s Bougainville’s atoll island of Cartaret have asked to be moved to higher ground on the mainland. Also the people of Sikaiana Atoll in the Solomon Islands have been migrating away from their atoll, primarily to Honiara, the capital. Similarly, there has been internal migration from the outer islands of Tuvalu to the capital Funafuti. In the case of Tuvalu, this migration has brought almost half of the national population to Funafuti atoll, with negative environmental consequences, including a demand on local resources.[[25]](#footnote-25)

In addition, warmer temperatures have led to the bleaching of the Pacific Island’s main source of survival – the coral reefs. Bleaching occurs when reef-building corals, reacting to stress such as warmer waters, loosen the algae that help feed them. Because the algae give them colour, the starved corals look pale, thus the term “bleaching”. Continued bleaching ultimately kills corals. Reef-building corals provide most of the primary productivity of coral reefs and an important shelter for the coral reef organisms. Reduction of abundance and diversity of reef-building corals is thus very likely to have a major influence on the surrounding biodiversity. Tropical fishery yields are on the decline worldwide and it is now clear that the conditions may become critical for the local fish population.[[26]](#footnote-26)

Agriculture in the Pacific region, especially in small island states, is becoming increasingly vulnerable due to heat stress on plants and salt water incursions. Hence, food security is of great concern to the region.

**3. Adapting to Climate Change:**

Adaptation to climate change is a necessary strategy to complement climate change mitigation effects. Adaptation often produces benefits as well as forming a basis for coping with future climate change. However, experience demonstrates that there are constraints to achieving the full measure of potential adaptation. There are many instances of, maladaptation, such as promoting development in risk-prone locations, which can occur due to decisions based on short-term considerations. The ability of human systems to adapt to and cope with climate change depends on factors such as wealth, technology, education, information, skills, infrastructure, access to resources and management capabilities.[[27]](#footnote-27)

There are already a number of documented case studies and examples where indigenous peoples have responded to climate change in innovative ways. Some case studies and examples are listed below according to the UNPFII’s seven indigenous regions:

**(i) Africa**

Indigenous knowledge is the basis for local level decision-making in many rural communities of Africa. Its value is not only for the culture in which it evolves, but also for scientists and planners striving to improve conditions in rural localities. Incorporating indigenous knowledge into climate change policies can lead to the development of effective adaptation strategies that are cost-effective, participatory and sustainable.

African communities and farmers have always coped with changing environments. They have the knowledge and practices to cope with adverse environments. The enhancement of indigenous peoples’ capacity is a key to the empowerment of local communities and their effective participation in development processes. Local farmers in several parts of Africa have been known to conserve carbon in soils through the use of zero-tilling practices in cultivation, mulching, and other soil-management techniques. Natural mulches, moderate soil temperatures do suppress diseases and harmful pests and conserve soil moisture. The widespread use of indigenous plant materials such as agrochemicals to combat pests that normally attack food crops, has also been reported among small-scale farmers. It is likely that climate change will alter the ecology of disease vectors, and indigenous practices of pest management would be useful adaptation strategies. Other indigenous strategies that are adopted by local farmers include controlled bush clearing; using tall grassesfor fixing soil surface nutrients which have been washed away by runoff; erosion-control to reduce the effects of runoff; restoring lands by using green manure; constructing stone dykes; managing low-lying lands and protecting river banks.[[28]](#footnote-28)

Adaptation strategies that are applied by pastoralists in times of drought include the use of emergency fodder, culling of weak livestock for food, and multi-species composition of herds to survive climate extremes. During drought periods, pastoralists change from cattle to sheep and goat husbandry, as their feed requirements are lower. The pastoralists’ nomadic mobility reduces the pressure on low-capacity grazing areas through their cyclic movements from the dry northern areas to the wetter southern areas of the Sahel. African women are particularly known to possess indigenous knowledge which helps to maintain household food security, particularly in times of drought and famine. They often rely on indigenous plants that are more tolerant to droughts and pests, providing a reserve for extended periods of economic hardships. For example, in southern Sudan, women are directly responsible for the selection of all sorghum seeds saved for planting each year. They preserve a variety of seeds that will ensure resistance to the range of conditions that may arise in any given growing season.[[29]](#footnote-29)

**(ii) Asia**

Long-term adaptation to climate change requires anticipatory actions, which would require considerable investment of capital, labor, and time. However, in the Asian region there are already constraints on resources and a lack of access to technology. For many indigenous peoples however, the impacts of climate change are already hitting vulnerable communities. Hence indigenous people, who are among the poor in the region are starting to adapt their lives to this reality. In Bangladesh, villagers are creating floating vegetable gardens to protect their livelihoods from flooding. In Vietnam, communities are helping to plant dense mangroves along the coast to diffuse tropical-storm waves.[[30]](#footnote-30)

It has been common for indigenous peoples to grow many different varieties of crops in order to minimize the risk of harvest failure and this is supplemented by hunting and fishing. Where there is market access, indigenous peoples also supplement their subsistence base with handicrafts, wage labour and forest products or by selling surplus crops. In other instances, indigenous peoples switch to extracting starch from wild Sago palms during droughts when crops suffer from lack of water.[[31]](#footnote-31)

**(iii) Central and South America and the Caribbean**

In this region, climate change has caused people to shift their agricultural activities and their settlements to a new location which is less susceptible to adverse climate conditions. For example, indigenous peoples in Guyana move from their savannah homes to forest areas during droughts and plant cassava, their main staple crop, on moist floodplains which are normally too wet for other crops. Similarly, in the Amazon region, in times of drought, indigenous peoples switch from their dependence on agriculture to reliance on fish. This occurred during the drought of 2005.[[32]](#footnote-32)

In other parts of the region, there has been a shift to new technology. For example, In El Salvador and Guatemala the primary source of fuel is wood and it is the job of indigenous women and girls to gather wood. Due to deforestation, the female members of the family experience difficulty as they spend approximately four hours, at least three to five times a week, searching for wood. Also, when they cook food for their households, they are exposed to toxic cooking smoke. Therefore, the use of clean, renewable energy, such as solar ovens, has been promoted among groups of women in their own neighbourhoods where they can learn from one another whilst practicing new technologies.[[33]](#footnote-33)

**(iv) Arctic**

In the Arctic region, indigenous peoples have developed a strong knowledge base of weather, snow and ice conditions as they relate to hunting, travel and natural resource availability. This knowledge has been developed over thousands of years and transmitted across the generations because of the need to survive in a harsh environment and also to survive off highly variable natural resources. Indigenous peoples’ traditional knowledge provides the basis for developing adaptation and natural resource management strategies in response to climate change.

The adaptation practices of indigenous peoples have included the shift to hunt alternative species when species such as geese and caribou have shifted their migration times and routes. Likewise, there has been a change to hunting marine species in open water later in the year under different sea and ice conditions. Other changes have included the freezing if foods where traditional technique of sun-drying food have been impossible due to unseasonable wet weather. The foods are frozen until there is sunny weather or dried indoors.[[34]](#footnote-34)

**(v) Central and Eastern Europe, Russian Federation, Central Asia and Transcaucasia**

Indigenous peoples in the Russian Federation see the priority for adapting to climate change by creating conditions for survival and preservation of traditional cultures. This will emphasize the importance of traditional environmental knowledge and involvement of indigenous peoples in the development of a climate and environmental surveillance network in the Russian Arctic, because such a network is vitally important not only for local and national needs, but also for the global polar community at large. Also, local and indigenous peoples of the Russian North believe they should be included in the development, dissemination and implementation of policies and decisions, particularly those that control anthropogenic influence on ecosystems. Further, there must be cooperation between indigenous peoples and the academic community so that local groups can actively participate in field research projects, and their results be communicated to and among local communities. Other strategies include education programs to improve public awareness of the issues that will go towards assisting indigenous peoples developing their own attitudes and ethical norms around adaptation measures to climate change. Finally, there is a need to consider development of financial and managerial mechanisms aimed at compensation for changes in traditional subsistence practices if such changes are induced by climate change.[[35]](#footnote-35)

**(vi) North America**

Some indigenous groups have expressed optimism in adapting to climate change, in particular that it is likely to create some economic opportunities. For example, the increased demand for renewable energy from wind and solar energy could make tribal lands an important resource for such energy, replacing fossil fuel-derived energy and limiting greenhouse gas emissions. The Great Plains could provide a tremendous wind resource and its development could help to reduce greenhouse gas emissions as well as alleviate the management problem of the Missouri River hydropower, helping to maintain water levels for power generation, navigation, and recreation. In addition, there may be opportunities for carbon sequestration.[[36]](#footnote-36)

This willingness to absorb new technologies is not new to many indigenous peoples in North America. For example,, new materials, and new ways of doing things forms a common theme in the histories of many Native peoples. Cloth (and the complexities of sewing woven textiles) replaced hides. Glass beads from Bohemia replaced porcupine quills. Aniline dyes replaced vegetable colorings. Steel knives replaced stone or bone implements. Cotton thread replaced sinew. For the future, indigenous peoples of North America believe adopting new technologies is likely to be the only means for dealing with the disruptions to their traditional subsistence economies[[37]](#footnote-37).

**(vii) Pacific**

Adaptive capacity and resilience in the Pacific is hampered by limited resources and lack of access to technology. However, the application of traditional knowledge and past experiences have been strengthened in various ways such as the implementation of traditional marine social institutions, as exemplified in the Ra’ui in Rarotonga, Cook Islands. This is an effective conservation management tool and is improving coral reef health. Indigenous peoples’ ecological knowledge and customary sea tenure may is also integrated with marine and social science to conserve the bumphead parrotfish in Roviana Lagoon, Solomon Islands. Changes in sea tenure, back to more traditional roles, have also occurred in Kiribati.[[38]](#footnote-38)

Traditional knowledge and practices are important to sustaining and managing the environment. In a coastal village on Vanua Levu, Fiji, the philosophy of *vanua* (which refers to the connection of people with the land through their ancestors and guardian spirits) has served as a guiding principle for the management and sustainable use of the rainforest, mangrove forest, coral reefs, and village gardens. Traditional knowledge serves as an important management framework in developing the skills for adaptive capacity in small island states. In other parts of the Pacific, indigenous peoples have built seawalls, provided a water drainage system and water tanks as well as banned tree clearing However, it is recognized in the Pacific that enhancing adaptative capacity involves more than local options which will only be successful if it is integrated with other strategies such as disaster preparation, land-use planning, environmental conservation and national plans for sustainable development[[39]](#footnote-39)

**4. Normative Framework:**

**(i) The United Nations Framework Convention on Climate Change**

The United Nations Framework Convention on Climate Change (UNFCCC) was an outcome of the 1992 United Nations Conference on Environment and Development, and the Earth Summit in Rio de Janeiro.

The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenges posed by climate change.  It recognizes that the climate system is a shared resource whose stability can be affected by industrial and emissions of carbon dioxide and other greenhouse gases.  The Convention entered into force on 21 March 1994 and has been ratified by 191 countries.

Under the Convention, governments:

* gather and share information on greenhouse gas emissions, national policies and best practices
* launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries
* cooperate in preparing for adaptation to the impacts of climate change[[40]](#footnote-40)

**(a) The Intergovernmental Panel on Climate Change (IPCC)**

The IPCC was established by the United Nations Environmental Programme (UNEP) and the World Meteorological Organization (WMO) in 1988 to assess the latest scientific, technical and socio-economic information relevant for the understanding of human induced climate change, its potential impacts and options for mitigation and adaptation. The IPCC does not conduct any research nor does it monitor climate related data or parameters but it produces reports that aim to reflect a range of views, expertise and wide geographical coverage. The IPCC has three Working Groups and a Task Force:

* [Working Group I](http://ipcc-wg1.ucar.edu/index.html) assesses the scientific aspects of the climate system and climate change.
* [Working Group II](http://www.ipcc.ch/wg2.htm) assesses the vulnerability of socio-economic and natural systems to climate change, negative and positive consequences of climate change, and options for adapting to it.
* [Working Group III](http://www.rivm.nl/env/int/ipcc/) assesses options for limiting greenhouse gas emissions and otherwise mitigating climate change.

**(b) The Kyoto Protocol**

The Kyoto Protocol was established in 1997 in Kyoto, Japan, under the United Nations Framework Convention on Climate Change and entered into force on 16 February 2005.

The industrial nations comprise 15 percent of world population yet, they account for almost half of emissions of CO2.[[41]](#footnote-41) Under the protocol’s terms, the industrialized countries have taken binding commitments to cut their emissions by a certain date (up to 2012) and by a certain percentage from their 1990 levels. The targets vary among the industrialized countries. It was agreed at Kyoto that the developing countries do not need to commit to cut their emissions because they have low per capita emission levels compared to developed countries, and therefore, they have the right to some “space” to increase their emissions as they develop their economies.[[42]](#footnote-42)

Some developed countries are now pressing for developing countries (or at least some of them) to also commit to emission reduction in the near future.  Developing countries argue that the industrialized nations have themselves not yet lived up to their Kyoto commitments, and thus the poorer countries should not yet be asked to make binding commitments. Further, many industrialized countries have not reduced their emissions in line with their commitments, and in fact, their emissions have actually increased above their 1990 levels.[[43]](#footnote-43)

**(c) Conference of the Parties and Subsidiary Bodies**

The Conference of the Parties (COP) is the highest decision-making authority. It is an association of all the countries that are Parties to the Convention. The COP is responsible for overseeing international efforts to address climate change. It reviews the implementation of the Convention and examines the commitments of Parties in light of the Convention’s objective, new scientific findings and experience gained in implementing climate change policies. [[44]](#footnote-44)

**(d) Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI).**

The Convention established two permanent subsidiary bodies: the **Subsidiary Body for Scientific and Technological Advice** (SBSTA) and the **Subsidiary Body for Implementation** (SBI). These bodies give advice to the COP and each has a specific mandate. They are both open to participation by any Party and in some cases NGOs and other intergovernmental agencies. SBSTA’s task is to provide the COP with advice on scientific, technological and methodological matters. SBSTA’s key areas of work include promoting the development and transfer of environmentally-friendly technologies, and conducting technical work to improve the guidelines for preparing national communications and emission inventories. SBSTA also carries out methodological work in specific areas, such as the Land use, Land use Change and Forestry (LULUCF) sector, hydro fluorocarbons (HFCs) and per fluorocarbons (PFCs), and adaptation and vulnerability. SBSTA also plays an important role as the link between the scientific information provided by expert sources such as the IPCC on the one hand, and the policy-oriented needs of the COP on the other. It works closely with the IPCC, sometimes request specific information or reports from it, and also collaborates with other relevant international organizations that share the common objective of sustainable development.[[45]](#footnote-45)

The SBI gives advice to the COP on all matters concerning the implementation of the Convention. One of its major task is to examine the information in the national communications and emission inventories submitted by Parties in order to assess the Convention’s overall effectiveness. It also provides advice to the COP on guidance to the financial mechanism (operated by the Global Environment Facility). The SBI advises the COP on budgetary and administrative matters and works together with SBSTA on cross-cutting issues such as capacity building, the vulnerability of developing countries to climate change and response measures, and the Kyoto Protocol mechanisms. [[46]](#footnote-46)

**(e) Indigenous Peoples’ Participation in UNFCCC Processes**

Indigenous peoples have engaged and continue to engage with the Climate Change Convention processes, but it is often very difficult to get their perspectives integrated in the final conclusions or the recommendations.[[47]](#footnote-47) As a result, indigenous peoples attending UNPFCC meetings have called for the creation of an Intersessional Ad hoc Working Group on Indigenous Peoples and Climate Change as a mechanism for improved participation within UNFCCC.[[48]](#footnote-48)

**(f)UNFCCC COP 13**

The 13th meeting of the Conference of Parties (COP) on UNFCCC will take place in Bali 3 – 14 December 2007. The meeting will be held in Nusa Dua, Bali, hosted by the Government of Indonesia.

According to the Head of the United Nations Framework Convention on Climate Change, Mr De Boer the UN Bali gathering needed to do four things to start negotiations for a way to curb climate-warming gases after the current accord, the Kyoto Protocol, expires in 2012. The meeting must agree to launch negotiations, determine the areas of discussion, decide on a deadline and create a mechanism for the negotiations.[[49]](#footnote-49)

The Bali meeting follows three reports this year by the UN Intergovernmental Panel on Climate Change, which shared the Nobel Peace Prize recently with former US Vice President Al Gore. The first report stated that with 90 percent probability that global warming is real, that human activities cause it and that the problem is urgent. The second report detailed the potentially disastrous consequences of unchecked climate change and the third report focused on what to do about it.

One of the major concerns is that there are countries who have consistently rejected setting mandatory targets for reducing emissions of carbon in favor of voluntary measures such as the USA and Australia, although with the change of Government, Australia is likely to ratify the Kyoto Protocol. This stance has hindered agreement with the Group of 77 developing countries. Hence, there is some apprehension as to whether the G77 will move quickly towards setting new targets if the USA is hesitant to become part of the global regime.

**5. Biofuels and Carbon Trading:**

Under the Kyoto Protocol, Parties have a certain degree of flexibility in meeting their emission reduction targets. The Protocol developed three innovative mechanisms - known as Emissions Trading, Joint Implementation and the Clean Development Mechanism (CDM). According to UNFCCC, these so-called ”market-based mechanisms” allow developed countries to earn and trade emissions credits through projects implemented either in other developed countries or in developing countries, which they  can use towards meeting their commitments. There is also the view that these mechanisms help identify lowest-cost opportunities for reducing emissions and attract private sector participation in emission reduction efforts. At the same time, developing nations benefit because of technology transfer and investment brought about through collaboration with industrialized nations under the CDM.[[50]](#footnote-50)

Meeting greenhouse gas emissions reduction though carbon emissions trading is an issue that continues to be debated in the international community. In many developing countries the production of biofuels, carbon sinks and carbon emissions trading are not only emerging issues, but also having a major impact on indigenous peoples. For example, biofuel crops such as oil palm plantation are now grown on lands that were once native forests in the tropical areas of Africa, Asia-Pacific, Latin America and the Caribbean. Many of these projects take place on indigenous peoples lands and territories.

An example is Indonesia, where each year the country loses an estimated two million of its 90 million hectares of rainforest, much of it to oil palm developments in Kalimantan, Sumatra, Riau, Sulawesi and Papua. Members of the indigenous Dayak peoples are trying to hold out against the relentless march of Indonesia's new boom crop eventhough they are being offered Rp425,000 (a little more than $50) a hectare for their lands by oil palm companies. Crude oil palm prices are expected to hit $US1000 ($1140) a tonne in the future and are increasingly being linked to the spectacular rise in fossil-based crude oil prices. Hence, not only are the indigenous peoples being moved off their lands but the compensation for doing so is a small drop in the ocean compared to the profits that oil palm companies are making.[[51]](#footnote-51)

In their paper *Oil Palm and Other Commercial Tree Plantations, Monocropping: Impacts on Indigenous Peoples’ Land Tenure and Resource Management Systems and Livelihoods*, Victoria Tauli-Corpuz and Parshuram Tamang provided a comprehensive overview of the issues around monocopping and its impact on indigenous peoples who have been evicted from their lands where large scale tree plantations were taking place.

Another example of eviction of indigenous peoples from their lands is the tree planting project in Mount Elgon National Park in eastern Uganda which initially seemed like a project that would benefit everyone.[[52]](#footnote-52) The Face Foundation, a nonprofit group established by Dutch power companies, would receive carbon credits for reforesting the park's perimeter. It would then sell the credits to airline passengers wanting to offset their emissions, reinvesting the revenues in further tree planting. The air would be cleaner, travelers would feel less guilty and Ugandans would get a larger park.However, to the Benet people or the Ndorobo, the indigenous peoples who have occupied Mt. Elgon in Uganda since time immemorial, the project has been anything but a boom. They have been fighting to get their land back since being evicted in the early 1990s and have pressed their case with lawsuits. [[53]](#footnote-53) Hence the appropriation of land such as this project in Uganda is part of a growing trade in voluntary carbon offsets.[[54]](#footnote-54)

Carbon sequestration through forest growth is said to mitigate global warming, but where plantation monocultures of exotic plants replace the fragile ecosystems of the *páramos (*a [neotropical](http://en.wikipedia.org/wiki/Neotropical) [ecosystem](http://en.wikipedia.org/wiki/Ecosystem) located in high elevations, between the upper forest line and the permanent snow line), the sequestration benefits are questionable. Due to weak legislation in developing countries, especially in Latin America, these plantations make it easier and cheaper for high-polluting developed countries to offset their greenhouse gas emissions in developing countries rather than in their own countries. The concern is that not all the costs are being counted. For example, the plantations negatively affect the hydrological cycle and also reduce the amount of land available for indigenous peoples. Hence, not only is the climate changing, so, too, are the lives of the indigenous peoples and farming communities.[[55]](#footnote-55)

The right to food is a growing issue in the world and is further exacerbated by biofuels. According to the Special Rapporteur on the Right to Food, Mr Jean Ziegler, “the creation of biofuels to protect the environment and reduce oil dependence was not a bad idea, but its negative impact on hunger would catastrophic’. He went to say that when tons of maize, wheat, beans and other food staples were converted to fuel, food prices rose and arable land was lost to food production”. He also pointed out the in 2006, the price of wheat doubled and maize prices quadrupled. Mr Ziegler warned that converting arable land to pure fuel production was a crime against humanity and he called for a 5-year moratorium on such activity. [[56]](#footnote-56)

While the debate continues, some indigenous peoples see the potential economic benefits in taking part in carbon trading projects, especially when they have already developed, over thousands of years, sustainable neutral and carbon negative livelihoods. A recent development of a unique carbon trading agreement, which claims to be the first of its kind in the world. In June 2007, a giant new natural gas refinery, ConocoPhillips agreed to pay the Aboriginal people of the Western Arnhem Land region of Australia, A$1m ($US850,000) per year, for 17 years, to offset 100,000 tons of the refinery's own greenhouse emissions. The Aboriginal people concerned will use traditional fire management practices which have been scientifically shown to reduce greenhouse emissions as compared to naturally occurring wildfires.[[57]](#footnote-57)

However, carbon trading continues to be a hugely contentious issue mainly due to its inherent problems. The main concern is that while companies do not have to actually reduce their emissions they can pay other companies and groups, mostly from non-industrialized countries, to reduce emissions or to absorb CO2 from the atmosphere, and account that as their own reductions. The big profit for companies is that when paying others, they pay only a fraction of what they would need to invest at home to achieve the same goal. [[58]](#footnote-58)

**6. Responses by UN Agencies:**

At the World Summit on Sustainable Development held in Rio de Janeiro in 1992, the World Bank, together with the United Nations Environment Programme and the UN Development Programme, was entrusted with the task of mobilizing the financial resources needed to implement the UN Framework Convention on Climate Change. The Global Environmental Facility (GEF), housed within the World Bank, was created as a mechanism for compensating developing countries for the addi­tional costs of undertaking activities to preserve biodiversity, prevent desertifica­tion, and protect the earth’s climate.

**(i) The World Bank**

The World Bank sees climate change as having a major impact on its goal on poverty reduction and has the potential to hamper the achievement of many of the Millennium Development Goals, including those on poverty eradication, child mortality, combating malaria and other diseases, and environmental sustainability. Climate change is clearly not just an environmental issue but one with severe socioeconomic implications, particularly in developing countries.

Accordingly, the World Bank has developed a **7-point Agenda on Addressing Climate Change:**

1. **Mainstream adaptation and mitigation** into core development work;
2. Provide innovative and concessional financing;
3. Pioneer and advance new market mechanisms;
4. Help create a link for environment to tap the private sector;
5. Support technology development and adoption in developing countries;
6. Support applied research on climate change economics in developing countries; and
7. Contribute to an international regime based on areas 1-6 above.[[59]](#footnote-59)

The World Bank is also a major international trader of carbon credits. At their third conference in Kyoto in December 1997, the Parties to the UN Framework Convention on Climate Change launched the Clean Development Mechanism (CDM). The CDM was designed as a scheme to allow countries with emissions reductions targets under the Kyoto Protocol to invest in projects that lead to emissions reductions in greenhouse gases in developing countries. Simul­taneously, the World Bank unveiled its own proposal for carbon trading, a Proto­type Carbon Fund (PCF). The fund officially opened in 1999. Since then, the Bank has created two other carbon funds and administers several funds on behalf of individual donor countries, including Italy, the Netherlands, and Spain.[[60]](#footnote-60)

The World Bank is the largest public broker of carbon purchases, with over $1 billion in its carbon credit portfolio. According to various commentators, internal documents on the origins of the Prototype Carbon Fund indicate that it was created as a way to generate revenue. The Bank can make between 5 - 10 percent in commissions on all the carbon credits it pur­chases.[[61]](#footnote-61)

The following concerns have been raised in regards to the Bank’s prominent role as carbon trader:

* The World Bank has actively lobbied the CDM to make its rules more investor friendly and seemingly less meaningful in terms of actually cutting climate pollution. In particular the Bank tried to weaken the interpretation of the CDM’s all-important concept of “additionality”, i.e. that a project should only be eligible for carbon credits if it could not go forward without the benefits it receives from these cred­its. [[62]](#footnote-62)
* The Bank’s carbon funds contracts to buy cred­its from projects that would likely be completed regardless of whether they received carbon credits. For example, the Xiaogushan hydropower project in China was declared the least-cost project option by the Asian Development Bank, and was already under construction when the World Bank proposed sup­porting it with carbon credits. In this case the carbon credits provided a financial bonus to the developers, but the financial incentive did not prevent greenhouse gases from being emitted.[[63]](#footnote-63)
* The World Bank’s role as a carbon trader puts a spotlight on the contradictions within the Bank’s own portfolio of energy projects. The Bank continues to contribute to climate change through its support for fossil fuel projects even while it purports to help solve the problem of climate change through its carbon funds. Between 1992 and 2004, the World Bank supported fossil fuel projects that have lifetime emissions of 1,457 megatons of carbon. This figure is four to 29 times the amount of emissions reductions anticipated under the CDM per year.[[64]](#footnote-64)

Around 20 percent of greenhouse gas emissions result from poor land management, especially deforestation, which not only threatens the environment but also destroys wildlife and erodes the natural wealth of the poor. Together with its partners, the World Bank is developing a Forest Carbon Partnership Facility that will help countries combat deforestation and be rewarded with carbon finance credits. Developing and industrialized countries have also requested the World Bank to explore a framework for piloting activities that would reduce emissions from deforestation and degradation using a system of policy approaches and performance-based payments.[[65]](#footnote-65)

The Forest Carbon Partnership Facility is expected to set the stage for a future, large-scale system of positive incentives for reducing emissions from deforestation and degradation. The Facility would finance capacity building to increase developing countries’ capacity to harness a future system of payments, and pilot performance-based carbon purchases for avoided emissions in a small number of countries. Subject to World Bank clearances, the Facility may be launched at COP13 in Bali and declared operational in 2008.[[66]](#footnote-66)

**(ii) United Nations Development Programme**

UNDP’s work in addressing climate change is considered extremely important because the effects of climate change are felt most intensely by developing countries. UNDP assists developing countries to choose energy pathways for the future which provide low-emission sources of power for economic growth. Along with the World Bank and UNEP, UNDP acts as one of the three implementing agencies for the Global Environmental Facility (GEF). The GEF finances the incremental costs of securing global environmental benefits consistent with national development goals and priorities. Since carbon dioxide emissions from burning fossil fuels for electrical power, transportation and heating are the primary factors in climate change, new approaches to energy production are needed in order to reduce greenhouse gas concentrations in the atmosphere. The major issues that for people in developing countries the problem is lack of access to needed energy services. Nearly two billion people in the world do not have electricity and close to the same number rely on traditional fuels such as firewood and dung for household needs. Energy is an essential engine for economic growth and sustainable livelihoods, especially in rural areas where the services are the most inadequate. For UNDP, the challenge involves extending access to energy services in an equitable manner, without adding to local and global climate impacts.[[67]](#footnote-67)

**(iii) United Nations Environment Programme**

In response to the needs of various states and requests from the Secretariat of the United Nations Framework Convention on Climate Change, UNEP has initiated and implemented a major programme on climate change outreach in regards to education, training and public awareness. The objectives are to provide states with the additional tools for promoting climate change awareness at the national level; support the efforts by civil society and NGOs to provide accurate and accessible messages of the IPCC on climate change; make the youth more aware of the climate change implications and motivated to take relevant climate friendly actions, and raise awareness of general public on climate change problems. To date, project partners have included the Governments of Kenya, Ghana , Namibia , Russia , Uzbekistan , Mexico , Albania , Georgia, the UNFCCC and IPCC Secretariats, WWF, TERI Institute, the Government of Norway and other donors. [[68]](#footnote-68)

UNEP has also undertaken national climate outreach campaigns in Namibia , Ghana , Kenya , Russia , Uzbekistan , Albania and Georgia . Each campaign identified local needs and priorities, promoted collaboration and networking among focal points and key stakeholders, produced popular brochures and booklets in local languages, organized radio and TV presentations on hot climate topics.[[69]](#footnote-69)

UNEP has entered into a partnership with TERI Institute (India) to promote environmental education among the school children in India . This programme covered more than 100 schools in 8 states of the country. Workshops have been conducted in various geographical regions to discuss common problems of climate change outreach, identify barriers and explore opportunities and strategies for overcoming these barriers. In this regard, UNEP co-sponsored and co-organized regional workshop for Africa , Latin America and the Caribbean , and for Asia-Pacific, and also organized a similar workshop for countries of the former Soviet Union.[[70]](#footnote-70)

UNEP is also supporting the development of criteria and indicators for assessing ecological and economic vulnerabilities to climate change and capacities for adapting at the regional level. Many of these criteria and indicators relate to key sectors for biodiversity, agriculture and water.

UNEP and the World Meteorological Organization (WMO) provide joint secretariat support to the Intergovernmental Panel on Climate Change (IPCC) and its bureau and working groups, including facilitating the participation of developing countries and countries with economies in transition in IPCC.

**(iv) The Convention on Biological Diversity**

Biodiversity and climate change are not only closely linked but each impacts on the other in that biodiversity is threatened by human-induced climate change, but at the same time biodiversity resources can also reduce the impacts of climate change on the population and ecosystems. Hence, the Convention on Biological Diversity (CBD) considers climate change as a serious issue and this was demonstrated at the fifth meeting of the Conference of the Parties (COP) which highlighted the risks of climate change, in particular, to both coral reefs and forest ecosystems and the serious impacts of biodiversity loss on both these areas and their associated livelihoods.[[71]](#footnote-71)

At its seventh meeting, the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) was requested to provide advice for promoting synergy among various activities to address climate change. Some of these activities included combating desertification and land degradation and the conservation and sustainable use of biodiversity. Further, the Conference of the Parties to the Untied Nations Framework Convention on Climate Change (UNFCCC) and to the United Nations Convention to Combat Desertification (UNCCD) were invited to collaborate with the CBD.[[72]](#footnote-72)

In 2006, at its eighth meeting, the COP highlighted the importance of integrating biodiversity into all relevant national policies, programmes and plans in response to climate change, and to develop tools for the implementation of biodiversity conservation activities that contribute to climate change adaptation. Further, the COP noted the need to identify mutually supportive activities to be conducted by the secretariats of the three Rio Conventions (UNFCCC, UNCCD, and CBD), parties and relevant organizations.[[73]](#footnote-73)

**(v) Food and Agriculture Organization of the United Nations**

FAO plays an important [role](http://www.fao.org/clim/role_en.htm)in assisting Member Countries with climate change issues related to agriculture and food security. FAO's programme on climate change includes a number of areas such as the promotion of practices for climate change [mitigation](http://www.fao.org/clim/mitigation_en.htm); the[adaptation](http://www.fao.org/clim/adaptation_en.htm) of agricultural systems to climate change; the reduction of[emissions](http://www.fao.org/clim/sources_en.htm) from the agricultural sector as far as it is carefully considered within the major objective of ensuring food security; the development of practices aimed at increasing the resilience of agricultural production systems to the vagaries of weather and climate change; national and regional observing systems, as well as data and information collection and dissemination.[[74]](#footnote-74)

FAO’s related coordination mechanism is the [Interdepartmental Working Group on Climate Change](http://www.fao.org/clim/activities_en.htm) (IDWG-CC) for mainstreaming and coordinating climate change related work among all FAO’s technical Departments. Its main objectives are to develop normative and methodological approaches integrating forestry, agricultural, cultural and economic issues in the context of climate change; and to open new channels of financing and other support measures for mitigating and adapting to climate change. The FAO web portal on PAIA-Climate Change provide information on all activities related to climate change and global warming issues.[[75]](#footnote-75)

FAO assists countries, mainly developing countries, which are vulnerable to climate change, to enhance their capacities to confront the negative impacts of climate variability especially its effects on agriculture. FAO collaborates on technical matters with the secretariat and subsidiary bodies of the Framework Convention on Climate Change (UNFCCC), the Intergovernmental Panel on Climate Change (IPCC), sister agencies such as the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP), the Secretariats and subsidiary bodies of the Convention on Biodiversity (CBD) and the Convention to Combat Desertification (CCD), as well as regional organizations.[[76]](#footnote-76)

**(vi) World Tourism Organization**

For tourism, climate change is not a remote event, but a phenomenon ‎that already affects the ‎sector and certain destinations in particular, ‎mountain regions and coastal destinations among ‎others. At the same ‎time, the tourism sector is contributing to greenhouse gas emissions ‎‎‎(GHG), especially through the transport of tourists.‎[[77]](#footnote-77) ‎

**The World Tourism Organization believes** climate is an essential resource for tourism, and especially for the ‎beach, nature and winter ‎sport tourism segments. Changing climate and ‎weather patterns at tourist destinations and ‎tourist generating countries ‎can significantly affect the tourists’ comfort and their travel ‎decisions. ‎Changing demand patterns and tourist flows will impact on tourism ‎businesses ‎and on host communities, as well as ‎related sectors, such as agriculture, ‎handicrafts or construction. ‎ In small island states and developing countries, where tourism is a major ‎economic activity, any ‎significant reduction in tourist arrivals will have ‎serious employment impacts and generate ‎further poverty.‎ [[78]](#footnote-78)‎

Since the 1st International Conference on Climate Change and Tourism, ‎convened in Tunisia in 2003, a growing body of ‎knowledge has been generated that addresses the ‎complex relationships ‎between the tourism sector and climate change with important research ‎‎activities on this subject.[[79]](#footnote-79) ‎

There is now a wide recognition of the urgent need for the tourism ‎industry, national ‎governments and international organizations to develop ‎and implement strategies to face the ‎changing climate conditions and to ‎take preventive actions, as well as ‎mitigate tourism’s ‎environmental impacts contributing to climate change. Such ‎‎strategies need to take into account the needs of developing ‎countries in terms of poverty ‎alleviation as well as implementing the Millennium ‎Development Goals.[[80]](#footnote-80)‎

**(vii) World Health Organization**

Climate change is likely to have an effect on all the important on all the basic health services such as safe drinking water, sufficient food, secure shelter, and good social conditions. Reviews of the likely impacts of climate change by the IPCC suggest that a warming climate is likely to bring some localized benefits, such as decreased winter deaths in temperate climates, and increases in food production in some, particularly high latitude, regions. Overall, the health effects of climate change are likely to be overwhelmingly negative, particularly in the poorest communities, which have contributed least to greenhouse gas emissions. Some of the health effects include:

* Increasing frequencies of heatwaves.
* More variable precipitation patterns are likely to compromise the supply of freshwater, increasing risks of water-borne disease.
* Rising temperatures and variable precipitation are likely to decrease the production of staple foods in many of the poorest regions, increasing risks of malnutrition.
* Rising sea levels increase the risk of coastal flooding, which may result in population displacement and relocation. Currently, more than half of the world's population now lives within 60km of the sea. Some of the most vulnerable regions are the Nile delta in Egypt, the Ganges-Brahmaputra delta in Bangladesh, and many small islands, such as the Maldives, the Marshall Islands and Tuvalu.
* Changes in climate are likely to lengthen the transmission seasons of important vector-borne diseases, and to alter their geographic range, potentially bringing them to regions which lack either population immunity or a strong public health infrastructure.[[81]](#footnote-81)

WHO co-ordinates reviews of the scientific evidence on the links between climate, climate change and health, including supporting the IPCC assessment process. Based on these assessments, WHO considers that rapid climate change poses substantial risks to human health, particularly among the poorest populations and therefore supports actions to reduce human influence on the global climate. These include carefully planned mitigation policies that bring direct health benefits, such as well-designed urban transport systems to reduce greenhouse gas emissions, as well as reduce the major health impacts of urban air pollution. Housing with efficient insulation that cut energy consumption and associated greenhouse gas emissions, which will reduce deaths from both cold and heat, and in poor countries, reduce the need for burning of biomass fuels and the impacts of indoor air pollution.[[82]](#footnote-82)

WHO recognizes that global warming will continue for at least several decades and its work is to support programmes that combat infectious disease, improve water and sanitation services and respond to natural disasters to reduce health vulnerability. WHO also works directly to build capacity to adapt to climate change such as conducting workshops in the most vulnerable countries to raise awareness of the health implications of climate change and related weather patterns, and to support intersectoral policies to reduce health vulnerability. Such activities aim at improving health conditions today, while simultaneously laying the ground for more adaptation measures to climate change in the future.[[83]](#footnote-83)

**(viii) United Nations Educational, Scientific and Cultural Organization**

Climate change is affecting the environment, societies, as well as the natural and cultural heritage.  Finding solutions to mitigate the negative impacts and adapt to changing conditions requires and approach that unites sound, unbiased science with a range of environmental, economic, informational, social, attitudinal and behavioural factors. Hence, UNESCO has concerns about the impacts of climate change on World Heritage sites.[[84]](#footnote-84)

UNESCO is able to provide a unique forum for addressing climate change and its impacts on the environment and human society. This is part of the Inter-Sectoral Task Force on Global Climate Change which was established by the Director-General to define a strategic and integrated approach for UNESCO on the issue of global climate change and to position the organization so that it can make a tangible contribution.[[85]](#footnote-85)

According to UNESCO, addressing climate change is not merely an environmental issue, but one that depends on a range of environmental, economic, information, social, cultural, gender, attitudinal and behavioural factors. Climate change calls for action in virtually all of UNESCO’s fields of competence. UNESCO has over 40 activities relevant to climate change in natural sciences, culture, education, social sciences, and communication. These can be grouped into the framework of four of the six principal thematic priorities identified for the UN system response to global climate change.

* [Scientific research and assessments](http://ioc3.unesco.org/unesco-climate/activities/assessment_research/index.php)
* [Adaptation to climate change](http://ioc3.unesco.org/unesco-climate/activities/adaptation/index.php)
* [Mitigation of climate change](http://ioc3.unesco.org/unesco-climate/activities/mitigation/index.php)
* [Monitoring aspects of climate change](http://ioc3.unesco.org/unesco-climate/activities/monitoring/index.php) [[86]](#footnote-86)

**(ix) United Nations Forum on Forests**

Deforestation is responsible for 20 percent of greenhouse gas emissions as forests are cleared for agricultural use. UNFF is of the view that if forests are managed effectively, they can become net carbon sinks because they are able to absorb about one tenth of global carbon dioxide emissions into the biomass, soil and forest products. Curbing deforestation and reforesting damaged areas is seen as a cost-effective way of mitigating climate change, while enhancing the security and livelihoods of forest-dependent people.

In April 2007, UNFF adopted a landmark international agreement in sustainable forest management. The new instrument sets standards in forest management that is expected to have a major impact on international cooperation and national action to reduce deforestation, prevent forest degradation and promote sustainable livelihoods. The next session on UNFF in 2009 will be on the issue of forests in a changing environment.

**(x) Commission on Sustainable Development**

Climate change formed part of the thematic cluster with energy, industrial development, and air pollution/atmosphere reviewed by the [Commission on Sustainable Development](http://www.un.org/esa/sustdev/csd/review.htm) at its [fourteenth session](http://www.un.org/esa/sustdev/csd/review.htm) in 2006 and [fifteenth session](http://www.un.org/esa/sustdev/csd/policy.htm) in 2007.  Climate change impacts can undermine a country’s effort to achieve the goals of sustainable development by increasing poverty in developing countries, especially the Least Developed Countries and the Small Island Developing States.[[87]](#footnote-87)

It is also increasingly recognized that climate change is a sustainable development issue and not just an environmental problem. Climate change impacts pose threats to the economic, social and environmental dimensions of sustainable development in almost all countries, climate change mitigation and adaptation polices have an impact on other sustainable development goals, and progress towards achieving other sustainable development goals can contribute to both climate change mitigation and adaptation. In this light, discussions at the recent 15th session (in 2007) of the Commission on Sustainable Development (CSD) highlighted the need to integrate climate change plans and policies into national sustainable development strategies.[[88]](#footnote-88)

The CSD is also concerned that climate change is expected to have an uneven impact on food production. Moderate temperature increases will see a rise in productivity at the global level, but at lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2ｰC), increasing risk of hunger.[[89]](#footnote-89)

**(xi) United Nations Conference on Trade and Development**

UNCTAD´s Climate Change Programme focuses on the trade and economic aspects of climate policies, biofuels and the Kyoto Protocol´s clean development mechanism (CDM). UNCTAD’s initiatives include exchanges of information, analytical studies, expert meetings and workshops to

* assess the trade and development implications of climate change policies;
* promote investment and secure development gains in developing countries under the Clean Development Mechanism of the Kyoto Protocol;
* provide support for governments, corporations and non-governmental organizations in assessing biofuels potential in developing countries; and
* support compatibility between climate policy and trade rules.[[90]](#footnote-90)

Since 2005 UNCTAD has given priority to biofuels, particularly as a trade and investment opportunity for developing countries, as one of the key trade and development issues in the current global environment. In 1997, with the Earth Council, UNCTAD established a Global Policy Forum on Carbon Markets for trading permits for greenhouse gas emissions.[[91]](#footnote-91)

Under the Kyoto Protocol, UNCTAD has supported efforts to engage the private sector in the clean development mechanism. [[92]](#footnote-92)

**(xii) International Fund for Agricultural Development (IFAD)**

**IFAD sees climate change as one of the most serious threats that the world currently faces. Poor rural people are the most vulnerable, but they have the potential to play an important role in climate change mitigation. IFAD believes there must be opportunities for poor rural people to adapt to, and cope with climate change, and they must to be part of the solution.**[[93]](#footnote-93)

Poor rural people in the developing world are the least responsible for producing greenhouse gases that are causing the Earth’s climate to change. Nearly one billion people survive on less than US$1 a day. About 75 per cent of them live in rural areas. They are subsistence farmers, nomadic herders, day labourers and fishers. Many live on ecologically fragile land: mountains, coastal areas and deserts. They depend on vulnerable sectors: agriculture, livestock, fisheries and forestry. Poor rural people lack the institutional and financial capacity to protect themselves against climate change. But they manage vast areas of land and forest, and can be important players in carbon sequestration. Helping them adapt to climate change in a sustainable way is an economic, social and moral imperative[[94]](#footnote-94).

Indigenous peoples are particularly vulnerable. They have a special role to play as stewards of our natural resources and biodiversity, yet they are often pushed out of their ancestral lands and onto the least fertile and most fragile lands.

Global warming is a universal problem but the response, whether adaptation or mitigation, needs to be tailored to local contexts. For 30 years, IFAD has been helping poor rural people living in marginal, rainfed areas at risk from water shortage, land degradation and desertification. Through its past operations, IFAD has supported the implementation of the United Nations Convention to Combat Desertification and gained considerable expertise in combating land degradation and desertification, as well as sustainable land and natural resource management. IFAD draws on this experience in helping poor rural people adapt to climate change in a local context. [[95]](#footnote-95)

Through loans and grants schemes, IFAD is addressing such issues as desertification and changes in cropping patterns due to climate variability. In response to the growing magnitude of climate change, IFAD is increasingly integrating adaptation into its operations and contributing to mitigation programmes in a way that will make them beneficial to poor rural people.[[96]](#footnote-96)

**7. Conclusion**

Indigenous peoples’ experiences and interpretation as well as scientific research indicate that climate change seldom acts in isolation but interacts with other environmental and social factors.

Given past experiences, indigenous peoples and their communities have been especially resilient and have adjusted to environmental and socio-economic changes. Further, they continue to fight to protect their rich social and cultural fabric and enduring community attachment. Assessment of adaptive capacity of indigenous peoples and their communities must take into account not only their inherent resiliencies, but also differential rights, discrimination and other social processes that limit access to resources, power and decision-making. In other words, the socio-cultural context in which community activities and livelihoods are situated is important.

For indigenous peoples, climate change is already a reality and poses threats and dangers to the survival of their communities. While there is scientific consensus, notably through the Intergovernmental Panel on Climate Change in regards to the threats that climate change poses, the response from governments have been slow. In September 2007, Mr Elisara-La’ulu, Director of Ole Siosimaga Society (OLSSI) in Samoa, said that bystanders, who knew the world was in crisis, but did nothing, were just as bad as the architects of the crisis.  He urged Government leaders to ask indigenous peoples about the effects of climate change before taking any decisions, and that indigenous peoples should not to act when under pressure from global processes driven by big Governments.[[97]](#footnote-97)

During the year (2007) there have been meetings and high-level events on climate change such as The Secretary-General’s high-level event entitled “The Future in our hands: addressing the leadership challenge of climate change”, UN Headquarters, 24 September 2007 and the recent *Pacific Regional Civil Society Organization Forum* in Tonga in October 2007, where a number of issues have been put forward that could be a focus for indigenous peoples.

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