Acceptance Speech for the Nobel Peace Prize Awarded to the Intergovernmental Panel on Climate Change (IPCC)

Delivered by

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Oslo

10 December 2007

Your Majesties, Your Royal Highnesses, Honourable Members of the Norwegian Nobel Committee, Excellencies, My Colleagues from the IPCC, Distinguished Ladies & Gentlemen.

As Chair of the Intergovernmental Panel on Climate Change (IPCC) I am deeply privileged to present this lecture on behalf of the Panel on the occasion of the Nobel Peace Prize being awarded to the IPCC jointly with Mr Al Gore. While doing so, I pay tribute to the thousands of experts and scientists who have contributed to the work of the Panel over almost two decades of exciting evolution and service to humanity. On this occasion I also salute the leadership provided by my predecessors Prof. Bert Bolin and Dr Robert Watson. One of the major strengths of the IPCC is the procedures and practices that it has established over the years, and the credit for these go primarily to Prof. Bolin for their introduction and to Dr Watson for building on the efforts of the former most admirably. I had requested Professor Bolin to receive this award on behalf of the IPCC, but ill health prevents him from being with us physically. I convey my best wishes to him. My gratitude also to UNEP and WMO for their support, represented here today by Dr. Mostapha Tolba, one of the founders of the IPCC and Dr. Michel Jarraud respectively. I express my deep thanks also to the Vice-Chairs of the IPCC, Professors Izrael, Odingo and Munasinghe for their contributions to the IPCC over the years.

The Fourth Assessment Report of the IPCC has had a major impact in creating public awareness on various aspects of climate change, and the three Working Group reports as part of this assessment represent a major advance in scientific knowledge, for which I must acknowledge the remarkable leadership of the Co-Chairs of the three Working Groups, Dr Susan Solomon, Dr Qin Dahe for Working Group I; Dr Martin Parry and Dr Osvaldo Canziani for Working Group II; and Dr Bert Metz and Dr Ogunlade Davidson for Working Group III respectively. The Synthesis Report, which distills and integrates the major findings from these three reports has also benefited enormously from their valuable inputs.

The IPCC produces key scientific material that is of the highest relevance to policymaking, and is agreed word-by-word by all governments, from the most skeptical to the most confident. This difficult process is made possible by the tremendous strength of the underlying scientific and technical material included in the IPCC reports.

The Panel was established in 1988 through a resolution of the UN General Assembly. One of its clauses was significant in having stated, "Noting with concern that the emerging evidence indicates that continued growth in atmospheric concentrations of "greenhouse" gases could produce global warming with an eventual rise in sea levels, the effects of which could be disastrous for mankind if timely steps are not taken at all levels". This means that almost two decades ago the UN was acutely conscious of the possibility of disaster consequent on climate change through increases in sea levels. Today we know much more, which provides greater substance to that concern.

This award being given to the IPCC, we believe goes fundamentally beyond a concern for the impacts of climate change on peace. Mr Berge Furre expressed eloquently during the Nobel Banquet on 10 December 2004 an important tenet when he said "We honour the earth; for bringing forth flowers and food – and

trees… The Norwegian Nobel Committee is committed to the protection of the earth. This commitment is our vision – deeply felt and connected to human rights and peace". Honouring the IPCC through the grant of the Nobel Peace Prize in 2007 in essence can be seen as a clarion call for the protection of the earth as it faces the widespread impacts of climate change. The choice of the Panel for this signal honour is, in our view, an acknowledgement of three important realities, which can be summed up as:

1) The power and promise of collective scientific endeavour, which, as demonstrated by the IPCC, can reach across national boundaries and political differences in the pursuit of objectives defining the larger good of human society.
2) The importance of the role of knowledge in shaping public policy and guiding global affairs for the sustainable development of human society.
3) An acknowledgement of the threats to stability and human security inherent in the impacts of a changing climate and, therefore, the need for developing an effective rationale for timely and adequate action to avoid such threats in the future.

These three realities encircle an important truth that must guide global action involving the entire human race in the future. Coming as I do from India, a land which gave birth to civilization in ancient times and where much of the earlier tradition and wisdom guides actions even in modern times, the philosophy of "Vasudhaiva Kutumbakam", which means the whole universe is one family, must dominate global efforts to protect the global commons. This principle is crucial to the maintenance of peace and order today as it would be increasingly in the years ahead, and as the well-known columnist and author Thomas Friedman has highlighted in his book "*The World is Flat*".

Neglect in protecting our heritage of natural resources could prove extremely harmful for the human race and for all species that share common space on planet earth. Indeed, there are many lessons in human history which provide adequate warning about the chaos and destruction that could take place if we remain guilty of myopic indifference to the progressive erosion and decline of nature's resources. Much has been written, for instance, about the Maya civilization, which flourished during 250–950 AD, but collapsed largely as a result of serious and prolonged drought. Even earlier, some 4000 years ago a number of well-known Bronze Age cultures also crumbled extending from the Mediterranean to the Indus Valley, including the civilizations, which had blossomed in Mesopotamia. More recent examples of societies that collapsed or faced chaos on account of depletion or degradation of natural resources include the Khmer Empire in South East Asia, Eastern Island, and several others. Changes in climate have historically determined periods of peace as well as conflict. The recent work of David Zhang has, in fact, highlighted the link between temperature fluctuations, reduced agricultural production, and the frequency of warfare in Eastern China over the last millennium. Further, in recent years several groups have studied the link between climate and security. These have raised the threat of dramatic population migration, conflict, and war over water and other resources as well as a realignment of power among nations. Some also highlight the possibility of rising tensions between rich and poor nations, health problems caused particularly by water shortages, and crop failures as well as concerns over nuclear proliferation.

One of the most significant aspects of the impacts of climate change, which has unfortunately not received adequate attention from scholars in the social sciences, relates to the equity implications of changes that are occurring and are likely to occur in the future. In general, the impacts of climate change on some of the poorest and the most vulnerable communities in the world could prove extremely unsettling. And, given the inadequacy of capacity, economic strength, and institutional capabilities characterizing some of these communities, they

would remain extremely vulnerable to the impacts of climate change and may, therefore, actually see a decline in their economic condition, with a loss of livelihoods and opportunities to maintain even subsistence levels of existence. Since the IPCC by its very nature is an organization that does not provide assessments, which are policy prescriptive, it has not provided any directions on how conflicts inherent in the social implications of the impacts of climate change could be avoided or contained. Nevertheless, the Fourth Assessment Report provides scientific findings that other scholars can study and arrive at some conclusions on in relation to peace and security. Several parts of our reports have much information and knowledge that would be of considerable value for individual researchers and think tanks dealing with security issues as well as governments that necessarily are concerned with some of these matters. It would be particularly relevant to conduct in-depth analysis of risks to security among the most vulnerable sectors and communities impacted by climate change across the globe.

Peace can be defined as security and the secure access to resources that are essential for living. A disruption in such access could prove disruptive of peace. In this regard, climate change will have several implications, as numerous adverse impacts are expected for some populations in terms of:

- access to clean water,
- access to sufficient food,
- stable health conditions,
- ecosystem resources,
- security of settlements.

Climate change is expected to exacerbate current stresses on water resources. On a regional scale, mountain snowpack, glaciers, and small ice caps play a crucial role in fresh water availability. Widespread mass losses from glaciers and

reductions in snow cover over recent decades are projected to accelerate throughout the 21st century, reducing water availability, hydropower potential, and the changing seasonality of flows in regions supplied by meltwater from major mountain ranges (e.g. Hindu-Kush, Himalaya, Andes), where more than one-sixth of the world's population currently lives. There is also high confidence that many semi-arid areas (e.g. the Mediterranean Basin, western United States, southern Africa, and northeastern Brazil) will suffer a decrease in water resources due to climate change. In Africa by 2020, between 75 and 250 million people are projected to be exposed to increased water stress due to climate change.

Climate change could further adversely affect food security and exacerbate malnutrition at low latitudes, especially in seasonally dry and tropical regions, where crop productivity is projected to decrease for even small local temperature increases (1–2 °C). By 2020, in some African countries, yields from rain-fed agriculture could be reduced by up to 50%. Agricultural production, including access to food, in many African countries is projected to be severely compromised.

The health status of millions of people is projected to be affected through, for example, increases in malnutrition; increased deaths, diseases, and injury due to extreme weather events; increased burden of diarrhoeal diseases; increased frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone in urban areas related to climate change; and the altered spatial distribution of some infectious diseases.

Climate change is likely to lead to some irreversible impacts on biodiversity. There is medium confidence that approximately 20%–30% of species assessed so far are likely to be at increased risk of extinction if increases in global average warming exceed 1.5–2.5 ºC, relative to 1980—99. As global average temperature exceeds about 3.5 ºC, model projections suggest significant extinctions (40%–

70% of species assessed) around the globe. These changes, if they were to occur would have serious effects on the sustainability of several ecosystems and the services they provide to human society.

As far as security of human settlements is concerned, vulnerabilities to climate change are generally greater in certain high-risk locations, particularly coastal and riverine areas, and areas whose economies are closely linked with climate-sensitive resources. Where extreme weather events become more intense or more frequent with climate change, the economic and social costs of those events will increase.

Some regions are likely to be especially affected by climate change.

- The Arctic, because of the impacts of high rates of projected warming on natural systems and human communities,
- Africa, because of low adaptive capacity and projected climate change impacts,
- Small islands, where there is high exposure of population and infrastructure to projected climate change impacts,
- Asian and African megadeltas, due to large populations and high exposure to sea level rise, storm surges, and river flooding.

The IPCC Fourth Assessment Report concludes that non-climate stresses can increase vulnerability to climate change by reducing resilience and can also reduce adaptive capacity because of resource deployment towards competing needs. Vulnerable regions face multiple stresses that affect their exposure and sensitivity to various impacts as well as their capacity to adapt. These stresses arise from, for example, current climate hazards, poverty, and unequal access to

resources, food insecurity, trends in economic globalization, conflict, and incidence of diseases such as HIV/AIDS.

Within other areas, even those with high incomes, some people (such as the poor, young children, and the elderly) can be particularly at risk.

Migration and movement of people is a particularly critical source of potential conflict. Migration, usually temporary and often from rural to urban areas, is a common response to calamities such as floods and famines. But as in the case of vulnerability to the impacts of climate change, where multiple stresses could be at work on account of a diversity of causes and conditions, so also in the case of migration, individuals may have multiple motivations and they could be displaced by multiple factors.

Another issue of extreme concern is the finding that anthropogenic factors could lead to some impacts that are abrupt or irreversible, depending on the rate and magnitude of climate change. For instance, partial loss of ice sheets on polar land could imply metres of sea level rise, major changes in coastlines, and inundation of low-lying areas, with greatest effects in river deltas and low-lying islands.

Global average warming above about 4.5 ºC relative to 1980–99 (about 5 ºC above pre-industrial) would imply:

- Projected decreases of precipitation by up to 20% in many dry tropical and subtropical areas.
- Expected mass loss of Greenland's ice if sustained over many centuries (based on all current global climate system models assessed) leading to sea level rise up to 4 metres and flooding of shorelines on every continent.

The implications of these changes, if they were to occur would be grave and disastrous. However, it is within the reach of human society to meet these threats. The impacts of climate change can be limited by suitable adaptation measures and stringent mitigation of greenhouse gas emissions.

Societies have a long record of adapting to the impacts of weather and climate. But climate change poses novel risks often outside the range of experience, such as impacts related to drought, heat waves, accelerated glacier retreat, and hurricane intensity. These impacts will require adaptive responses such as investments in storm protection and water supply infrastructure, as well as community health services. Adaptation measures essential to reduce such vulnerability, are seldom undertaken in response to climate change alone but can be integrated within, for example, water resource management, coastal defence, and risk-reduction strategies. The global community needs to coordinate a far more proactive effort towards implementing adaptation measures in the most vulnerable communities and systems in the world.

Adaptation is essential to address the impacts resulting from the warming which is already unavoidable due to past emissions. But, adaptation alone is not expected to cope with all the projected effects of climate change, and especially not in the long run as most impacts increase in magnitude.

There is substantial potential for the mitigation of global greenhouse gas emissions over the coming decades that could offset the projected growth of global emissions or reduce emissions below current levels. There are multiple drivers for actions that reduce emissions of greenhouse gases, and they can produce multiple benefits at the local level in terms of economic development and poverty alleviation, employment, energy security, and local environmental protection.

The Fourth Assessment Report has assessed the costs of mitigation in the coming decades for a number of scenarios of stabilisation of the concentration of these gases and associated average global temperature increases at equilibrium. A stabilisation level of 445–590 ppm of CO2 equivalent, which corresponds to a global average temperature increase above pre-industrial at equilibrium (using best estimate climate sensitivity) of around 2.0–2.4 ºC would lead to a reduction in average annual GDP growth rate of less than 0.12% up to 2030 and beyond up to 2050. Essentially, the range of global GDP reduction with the least-cost trajectory assessed for this level of stabilisation would be less than 3% in 2030 and less than 5.5% in 2050. Some important characteristics of this stabilisation scenario need careful consideration:

- For a CO2-equivalent concentration at stabilization of 445–490 ppm, CO2 emissions would need to peak during the period 2000–15 and decline thereafter. We, therefore, have a short window of time to bring about a reduction in global emissions if we wish to limit temperature increase to around 2 ºC at equilibrium.
- Even with this ambitious level of stabilisation the global average sea level rise above pre-industrial at equilibrium from thermal expansion only would lie between 0.4–1.4 metres. This would have serious implications for several regions and locations in the world.

A rational approach to management of risk would require that human society evaluates the impacts of climate change inherent in a business-as-usual scenario and the quantifiable costs as well as unquantifiable damages associated with it, against the cost of action. With such an approach the overwhelming result would be in favour of major efforts at mitigation. The impacts of climate change even with current levels of concentration of greenhouse gases would be serious enough to justify stringent mitigation efforts. If the concentration of all greenhouse gases and aerosols had been kept constant at year 2000 levels, a further warming of

about 0.1 ºC per decade would be expected. Subsequent temperature projections depend on specific emission scenarios. Those systems and communities, which are vulnerable, may suffer considerably with even small changes in the climate at the margin.

Science tells us not only that the climate system is changing, but also that further warming and sea level rise is in store even if greenhouse gases were to be stabilized today. That is a consequence of the basic physics of the system. Social factors also contribute to our future, including the 'lock-in' due, for example, to today's power plants, transportation systems, and buildings, and their likely continuing emissions even as cleaner future infrastructure comes on line. So the challenge before us is not only a large one, it is also one in which every year of delay implies a commitment to greater climate change in the future.

It would be relevant to recall the words of President Gayoom of the Maldives at the Forty Second Session of the UN General Assembly on the 19 October 1987:

"As for my own country, the Maldives, a mean sea level rise of 2 metres would suffice to virtually submerge the entire country of 1,190 small islands, most of which barely rise 2 metres above mean sea level. That would be the death of a nation. With a mere 1 metre rise also, a storm surge would be catastrophic, and possibly fatal to the nation."

On 22 September 1997, at the opening of the thirteenth session of the IPCC at Male, the capital of the Maldives, President Gayoom reminded us of the threat to his country when he said, "Ten years ago, in April 1987, this very spot where we are gathered now, was under two feet of water, as unusually high waves inundated one third of Male, as well as the Male International Airport and several other islands of our archipelago." Hazards from the impacts of climate change

are, therefore, a reality today in some parts of the world, and we cannot hide under global averages and the ability of affluent societies to deal with climate-related threats as opposed to the condition of vulnerable communities in poor regions of the globe.

The successive assessment reports published by the IPCC since 1990 demonstrate the progress of scientific knowledge about climate change and its consequences. This progress has been made possible by the combined strength of growing evidence of the observations of changes in climate, dedicated work from the scientific community, and improved efforts in communication of science. We have now more scientific evidence of the reality of climate change and its human contribution. As stated in the Fourth Assessment Report, "warming of the climate system is unequivocal", and "most of the global average warming over the past 50 years is very likely due to anthropogenic greenhouse gases increases".

Further progress in scientific assessment needs however to be achieved in order to support strong and adequate responses to the threats of climate change, including adaptation and mitigation policies.

There is also notable lack of geographic data and literature on observed changes, with marked scarcity in developing countries. Future changes in the Greenland and Antarctic ice sheet mass are another major source of uncertainty that could increase sea level rise projections. The need for further scientific input calls for continued trust and cooperation from policymakers and society at large to support the work needed for scientific progress.

How climate change will affect peace is for others to determine, but we have provided scientific assessment of what could become a basis for conflict. When Mr. Willy Brandt spoke at the acceptance of the Nobel Peace Prize in 1971, he

said, "...we shall have to know more about the origins of conflicts. ... As I see it, next to reasonable politics, learning is in our world the true credible alternative to force."

At a fundamental level the world now has to create knowledge and practice on a path of development which is not resource degrading and carbon intensive. Human ingenuity and strength are capable of meeting this challenge. Dr. Gro Harlem Brundtland told us 20 years ago of the importance of sustainable development as the path to peace and prosperity. We need to commit ourselves to that path today before it is too late.

The thirteenth Conference of the Parties to the UN Framework Convention on Climate Change is being held in Bali right now. The world's attention is riveted on that meeting and hopes are alive that unlike the sterile outcome of previous sessions in recent years, this one will provide some positive results. The work of the IPCC has helped the world to learn more on all aspects of climate change, and the Nobel Peace Prize Committee has acknowledged this fact. The question is whether the participants in Bali will support what Willy Brandt referred to as "reasonable politics". Will those responsible for decisions in the field of climate change at the global level listen to the voice of science and knowledge, which is now loud and clear? If they do so at Bali and beyond then all my colleagues in the IPCC and those thousands toiling for the cause of science would feel doubly honoured at the privilege I am receiving today on their behalf.

Thank you!