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Adaptation to Climate Change:

Addressing the Capacity Building and Technical Assistance Needs of Highly Vulnerable Commonwealth Countries

A Paper by the Commonwealth Secretariat

Commonwealth Secretariat
Marlborough House, Pall Mall
London SW1Y 5HX
United Kingdom

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Adaptation to Climate Change:
Addressing the Capacity Building and Technical Assistance Needs of Highly Vulnerable Commonwealth Countries[1]

EXECUTIVE SUMMARY

Introduction

1. This paper is a considered response to mandates from Commonwealth Heads of Government Meetings held in Abuja (2003) and Malta (2005), which recognised a Commonwealth role in addressing the technical assistance and capacity building needs of highly vulnerable member states in their efforts to adapt to climate change. The paper has been developed through desk study, inter-governmental consultations, and consultations amongst Commonwealth organisations, professional groups and experts. It constitutes a needs assessment, gap analysis and detailed consideration of the role the Commonwealth can play in addressing priority concerns of its member states.

2. The paper is divided into three sections. Part I constitutes an assessment of the impacts of climate change on small states and least developed countries of the Commonwealth and through this, their priority needs for capacity building and technical assistance. Part II reviews the current international framework for assistance on adaptation to climate change and considers where the Commonwealth is particularly well placed to add value and address critical gaps. Part III presents a framework of Commonwealth support on adaptation to climate change in response to the analysis that has gone before.

Adaptation Concerns of Highly Vulnerable Member States

3. In examining the needs of Commonwealth countries that are *`highly vulnerable to climate change'*, the paper focuses on small states, African countries and other Least Developed Countries (LDCs) that face a high exposure to risk, as well as significant constraints in their capacity to adapt. It also recognises that for atoll states and some other member states, their inherent physical characteristics – having a restricted land mass, being low-lying and exposed to extreme weather events – mean that they face real limits to adaptation. For all states, but especially for these states, mitigation also remains a critical concern.

4. The impacts of climate change in least developed countries and small states are reviewed in detail on a sector-by-sector basis, drawing on examples from member states. Climate change risks in small states include sea-level rise, and increases in severe weather-related disasters and water stress. Because of their limited land resources, expensive hard technology approaches and migration may be the only options for adaptation. In Africa, changes in rainfall distribution are a concern for agriculture, food security and energy generation. African member states also face further physical impacts including sea-level rise, changes in temperature extremes (such as heat waves), and an increase in the frequency and intensity of storms. In Asia, key concerns relate to water stress, impacts on agriculture and

[1] The Commonwealth Secretariat would like to acknowledge contributions to this paper by Laurel Murray, Saleemul Huq, Alan Pottinger, Farhana Yamin, Tom Mitchell and Sachooda Ragoonaden.

food security and sea level rises in coastal areas. Poverty, inequitable land distribution, conflict, HIV/AIDS, and debt also mean that many highly vulnerable countries lack the adaptive capacity to cope and adjust compared to more developed countries.

5. The paper highlights a basic concern about the adaptive capacity of highly vulnerable countries. Countries need the basics of sustainable development to be in place if they are to succeed in managing the impacts of climate change within their societies, and at all levels climate change impacts need to be linked to delivery of the Millennium Development Goals (MDGs) and addressed in Poverty Reduction Strategy Papers (PRSPs).

6. Technical assistance and capacity building is needed in the following areas:

- Climate scenario building, vulnerability assessment, and learning from the experiences of communities that are already adapting to climate change;
- Collection and management of observational data;
- Research and development, and technology transfer, which are needed to address impacts in key sectors such as agriculture, water, energy;
- Economic, land-use and development planning that integrates climate change predictions and the concerns and knowledge of local communities;
- The analysis of socio-economic impacts of climate change (including a better understanding of gender impacts), to improve policy and address the needs of the most vulnerable groups;
- Identifying and responding to the links between health and climate change;
- Analysing security concerns arising from climate change, including increasing water and energy insecurities, and large-scale movement of populations resulting from slow- and rapid-onset disasters;
- Increasing the availability of funding of adaptation projects on the ground; and
- Developing further the role of local communities and professionals in guiding and implementing adaptation.

International Support on Adaptation to Climate Change

7. Under the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, funds have been created that support the preparation of National Adaptation Programmes of Action by Least Developed Countries and more generally the implementation of adaptation activities. A Work Programme on Adaptation has also been agreed under the UNFCCC to improve information flows and the assessment of tools and approaches for adaptation.

8. The attention given to climate change concerns by international donor organisations and governments has increased in recent years. In particular, international organisations are investigating the linkages between climate change and development. One study by the OECD has shown that in Egypt and Bangladesh, an estimated US$1-2 billion was directed towards sectors affected by climate change from 1998-2002. Clearly, climate change needs to be integrated into the planning and design of development programmes for them to be effective.

9. The paper reviews regional initiatives on adaptation to climate change from which vulnerable member states benefit. While progress on funding has been made in recent years, there remain significant obstacles in accessing sufficient financing for adaptation projects on

the ground. Further work is also needed to develop and operationalise regional frameworks for adaptation to climate change.

10. There is a wide range of activities taking place with respect to the needs identified in paragraph 6 above, reflecting a mobilisation of institutions at all levels. However, vulnerable member states have expressed their concerns that these efforts must be expanded if they are to meet the scale and urgency of their concerns on adaptation to climate change. The Commonwealth has a role to play in this respect, drawing on the strengths of the institution to add value where it can.

11. The Commonwealth's strength lies in the diversity of its membership. Commonwealth countries vary greatly in terms of country size, geographical location, income and type of economy, but members share a common working language and similar legal, political and educational systems. As a result, Commonwealth initiatives provide an opportunity to network across regions and among individuals and organisations, to share solutions, develop skills and build political consensus to address problems. The Commonwealth's networks are a particularly important resource in working at different levels of governance, engaging central and local government, civil society and professionals.

12. Part III of the paper presents a programme of work to be implemented across a range of Commonwealth networks to address member states' priority concerns. The advantage of this approach is that the Commonwealth can work at national and regional levels (top-down), through its inter-governmental networks; with local authorities; and with community-based organisations and professional associations (bottom-up), as well as linking these levels together through partnership approaches.

A Commonwealth Role on Adaptation to Climate Change

13. The actions outlined below are the outcome of continuing consultations amongst Commonwealth institutions which are pursuing concerns of their members related to climate change, within the mandates and processes of their respective institutions.

<u>Commonwealth Secretariat</u>

a) Understanding the risks

- Liaising with key institutions and member states to explore the Commonwealth's role in building in-country capacity in climate modelling, scenario-building and risk mapping, drawing on world-class Commonwealth expertise in this area, being aware of existing initiatives and supporting the Nairobi Work Programme.

b) Public Awareness and Engagement of Stakeholders

i) Engaging Youth

- Engaging young people in awareness raising on climate change and other pressing environmental issues through existing programmes and peer-to-peer education;
- Tapping the knowledge base of young people and their grassroots organisations as part of environmental monitoring and scientific data gathering;

- Engaging young people in technology transfer and uptake issues, including for example youth participation in 'citizens' juries';
- Training young people in natural disaster preparedness and relief;
- Stimulating ethical consumerism among young people as an entry point to environmental awareness;
- Mainstreaming environmental education and debate as part of school curricula;
- Exploring the concerns of young people on adaptation to climate change through regional centres in Africa, Asia, the Caribbean and Pacific, and the Youth Caucus, bringing these to the attention of Commonwealth Youth Ministers; and
- Reviewing and updating the CYP's flagship Diploma in Youth Development Work.

ii) Engaging Parliamentarians

- Working with the Commonwealth Parliamentary Association to strengthen the capacity of parliamentarians to play a leadership role in preparing their constituencies for addressing climate change (see below).

iii) Engaging Other Secretariat Stakeholders

- Mainstreaming climate change into the Secretariat's advisory work, communications strategy and day-to-day operations.
- Advocacy work related to the concerns of vulnerable member states, implemented through the Commonwealth Secretariat policy development Divisions, and meetings of Youth, Education, Women's Affairs, Law, Human Settlements and Environment Ministers, as appropriate.

c) Curriculum Development and Exchange

- Exploring the potential for exchange of curricula at the tertiary level in small states, through a study of needs and gaps, and by engaging tertiary institutions, the Commonwealth of Learning, and the University Consortium of Small Island States.

d) Advocacy and Policy Networking

- Climate Hot Topics briefing service for vulnerable member small states;
- Regional and/or pre-negotiation workshops to exchange experiences and prepare for discussions (implemented in collaboration with other institutions active in this area);
- Policy and advocacy work related to specific areas such as the examination by SBSTA-28 of implementation of the Nairobi Work Programme.
- Examining the adequacy of legislative frameworks in support of disaster risk reduction and adaptation to climate change.

e) Technical Assistance

- Placement of CFTC Advisers in key institutions in small states regions, to help to network small states regions; support highly necessary regional platforms for adaptation; and increase support to national-level implementation, including in their preparation of applications to funding institutions; and

- Networking and exchange of experiences in mitigation and adaptation to climate change across key sectors highlighted in the needs assessment.

Commonwealth Foundation

- Facilitating consultations amongst Commonwealth Associations in the following areas: information and awareness-raising; education; action in communities; and action by professional networks (including health, built environment, education and natural resources networks).
- Further developing proposals on community-based adaptation to climate change in time for the Uganda CHOGM in 2007.

Commonwealth Parliamentary Association

- Implementation of a Study Group on Parliamentarians and The Environment (Belize, 2007).

ComHabitat[2]

- Reviewing planning guidelines and legislative frameworks by governments (through the Commonwealth Secretariat); local government (through the Commonwealth Local Government Forum); and professional groups (through the Commonwealth Foundation).
- Advocating implementation of the Commonwealth Association of Planners 'New Urban Planning' initiative, to strengthen skills that underpin new approaches that address risks to development.

Commonwealth Meteorological Conference

- Advocating concerns around the impacts of climate change and exploring concrete opportunities to develop their services and skills to meet the challenge of adaptation to climate change.

Commonwealth Forestry Association

- Working with partners to integrate climate change into the mainstream objectives and work programmes of Forest Departments and forestry-related CSOs throughout the Commonwealth.

ISSUES FOR MINISTERS

14. Activities outlined by the Commonwealth Secretariat in Part III of this paper can be delivered within the current envelope of resources. These resources are very modest, so the approach has emphasised mainstreaming of climate change within existing work programme streams. However, at a recent consultation with Commonwealth officials in the wings of the Nairobi Conference of the Parties to the UNFCCC a number of officials noted that an 'effective' Commonwealth programme on adaptation would need expanded resources.

[2] ComHabitat is a Commonwealth partnership supporting implementation of the Habitat Agenda. It comprises the Ministerial-level Commonwealth Consultative Group on Human Settlements and agencies from government, local government, civil society and the private sector.

In addition to the activities outlined in this paper, small states and least developed countries suggested that the Commonwealth:

- Implement a Commonwealth workshop of technical experts to identify acceptable, scientifically-based, climate scenarios for atoll states.

- Develop a programme of workshops to build technical capacities in member states in support of adaptation to climate change; and

- To support small states in accessing experts and teams of advisers to support national assessment and adaptation strategies. This is a matter of interest to the Commonwealth Foundation in its work with professional associations, and to the Commonwealth Secretariat's Roster of Experts.

15. In their discussion on the Commonwealth's role on adaptation to climate change, Ministers may wish to consider the following points:

- How can Commonwealth institutions best advance the proposals outlined above and presented in Part III of the paper by building alliances and collaborative approaches amongst member states, and with other institutions, to implement the Commonwealth Heads of Government mandates from Abuja (2003) and Malta (2005) and support member states' objectives under the UNFCCC?

- What political issues related to climate change will be of concern to the forthcoming Commonwealth Heads of Government Meeting in Kampala in 2007?

- The Commonwealth Secretariat has a strong track record in managing special project funds such as the environment training programme that was agreed after the Langkawi CHOGM, the Trade and Investment Access Facility, and other discrete funding sources. What are the prospects for establishing '*A Special Fund for Knowledge-based Capacity Building*' to support expanded opportunities for CFTC Advisers, Commonwealth volunteers and training in technical fields related to adaptation to climate change?

ADAPTATION TO CLIMATE CHANGE:

ADDRESSING THE CAPACITY BUILDING AND TECHNICAL ASSISTANCE NEEDS OF HIGHLY VULNERABLE COMMONWEALTH COUNTRIES

Introduction

16. This paper is a response to mandates from recent Commonwealth Heads of Government Meetings. In Abuja (2003), Heads of Government reaffirmed Commonwealth support through technical assistance to address the adaptation concerns of small island and other states that are particularly vulnerable to global warming and sea level rise. In Malta (2005), they called for "co-operation and continued international efforts to address the specific challenges posed by climate change, in accordance with the principle of common but differentiated responsibilities and adaptation, including capacity building, and saw a role for the Commonwealth in progressing this agenda". Heads also called for action to increase capacity for disaster preparedness, early warning systems, risk mitigation and post-disaster recovery and reconstruction, recognising the particular concerns of small states with natural disasters and the impacts of global climate change.

17. The paper is based on desk study, inter-governmental consultations and discussions amongst Commonwealth Associations and professional groups. It seeks to outline the Commonwealth's role in addressing priority capacity building and technical assistance needs of its highly vulnerable member states in adaptation to climate change.

18. Part I examines which member states may be considered particularly vulnerable to climate change. The subsequent analysis focuses on the needs of Least Developed Countries and small island developing states. The impacts that these countries are likely to face from climate change are examined by sector, with concerns of individual member states illustrated throughout. Part I concludes with a look at the priority capacity building and technical assistance needs that arise out of the analysis of impacts, highlighting needs across a range of sectors.

19. Part II presents the current international framework for assistance in addressing the adaptation concerns of highly vulnerable member states. It then reviews the major initiatives taking place in each region and considers where the Commonwealth is best placed to add value and address strategic gaps.

20. Part III presents a framework of Commonwealth support on adaptation to climate change. Commonwealth Heads of Government stressed that climate change is one of the greatest challenges facing member states and the wider international community. This framework illustrates the Commonwealth's deepening engagement on these issues and represents an effort to galvanise its networks to provide practical support.

PART I: ADAPTATION CONCERNS OF HIGHLY VULNERABLE MEMBER STATES

21. Global warming is already taking place. In the last century, mean global temperatures rose by 0.7ºC with measurable impacts for physical and biological systems. The authority for climate change science, the International Panel on Climate Change, predicts a further increase between 1.4–5.8°C by 2100 (2001), the socio-economic consequences of which would be devastating for many regions, particularity low-lying island states and Least Developed Countries. A mean temperature rise of 2°C this century now seems inevitable, perhaps even understated, due to mounting greenhouse gas emissions and trends in land-use. Those most vulnerable to climate change will be the world's poor, wherever they live, and those inhabiting small island developing states. Rising global temperatures will cause temperature extremes, changes in rainfall distribution, an increase in the frequency and intensity of extreme weather events, and sea-level rise. There will be direct impacts for development in relation to climate-dependent activities such as hydropower, infrastructure, and agriculture; and indirect consequences for poverty, the economy, human health, and conflict. Indeed, it is widely recognised that climate change will pose a real and long-term threat for the Millennium Development Goals. The 2006 drought in East Africa is one of the worst on record with more than 8 million people in need of food aid. It is a stark reminder of how development and the economy are still largely dependent on the climate. For atoll states, climate change and sea level rise may overwhelm them and in this sense there is a limit to the adaptation that they can achieve. For all states, but especially atoll states, mitigation remains a pressing concern.

22. This section outlines the impacts of climate change in different regions, and provides an initial assessment of the technical and capacity-building needs for some of the most vulnerable Commonwealth countries.

1. Defining Vulnerability and Adaptation

a) Vulnerability to Climate Change

23. Vulnerability to climate change involves "both exposure and sensitivity to changes in climate". Susceptibility to harm comes from a number of factors. The first relates to the risks arising from geographical position or physical environment. These factors produce inherent vulnerabilities. For example, coastal communities and low-lying islands are particularly vulnerable to climate change through sea-level rise, which can cause increased incidents of storm surges, flooding and the intrusion of salt water into fresh water lenses. Another example is the geographic position of some countries or communities which exposes them to extreme weather events, including droughts and hurricanes, which are predicted to become exacerbated by climate change.

24. There is another set of factors which relate to the ability of societies and ecosystems to adjust to long-term climatic change and bounce back from extreme weather events. These factors are amenable to adjustment through policy and social change, though the difficulty of achieving this is not to be underestimated. Poverty, poor governance and inadequate social and institutional resources raise susceptibility to harm. Such conditions result in low "adaptive capacity" where the underlying social-economic situation does not allow

communities to cope and adapt to shocks and long-term changes. Biodiversity is also critical to enable ecosystems to adjust to climate change and continue to provide critical environmental services that underpin water provision, energy, food security, raw materials for manufacture and the basis for economic activities such as tourism. Vulnerability analysis should also take into consideration the impact of climate change on vulnerable groups including women, older persons and persons with disability.

25. Countries need to get the basics of sustainable development in place if they are to succeed in managing the impacts of climate change within their societies. A country with severely degraded watersheds will experience water security problems whether or not there is climate change. However, if climate change then results in greater rainfall and run-off, soil degradation will be further exacerbated. If it faces more prolonged and frequent droughts, the water storage capacity of the watershed will have been critically weakened. In both cases, a degraded and poorly managed environment becomes a critical factor in reducing the capacity for adaptation. An effective response to climate change rests on comprehensive environmental management frameworks, a well educated population, and effective institutions informed by a strong scientific and technical base. Governance arrangements are also a critical part of the picture, to ensure people have access to land, water and markets; and enable the effective participation of all groups in formulating and implementing actions to reduce the risks that they face.

a) Adaptation to Climate Change

26. Adaptation is the process of coping with the potential impacts of climate change and encompasses both planned (anticipatory) and reactive strategies. Although the ability to adapt (adaptive capacity) is strengthened through greater resources and social-economic development, it also comes with such factors as experience, knowledge, and dependency on the natural environment and weather systems. The majority of climate change literature and policy, as well as the UNFCCC process, adhere to a management approach where planned adaptation is central. Such top-down climate change policy is necessary for all countries. However, for developing countries which have limited financial and technological resources, a stakeholder negotiated perspective that builds on existing knowledge systems and coping strategies is also crucial.

b) Conclusions

27. The United Nations Framework Convention on Climate Change (UNFCCC) identifies Small Island Developing States (SIDS) and Least Developed Countries (LDCs) as the two groups of countries that are most vulnerable to climate change. The third assessment report of the Inter-governmental Panel on Climate Change (IPCC) has also identified Africa and Asia as the two continents that are most vulnerable to the adverse impacts of climate change.

28. Small Island Developing States (SIDS) are widely recognised as being at high risk to climate change impacts. For them, there are unavoidable risks from sea-level rise and weather-related disasters. Because of limited land resources, expensive hard technology approaches and migration may be the only options. Most SIDS are either very low-lying, not exceeding 3–4m above sea level, or their habitable land is heavily concentrated in coastal areas. This puts SIDS at high risk to sea-level rise. For islands such as the Maldives, a 1m rise in sea level will render entire islands and atolls uninhabitable and demonstrates that there

are limits to adaptation. Already on the Carteret atolls of Papua New Guinea, rising sea-levels have cut off one island leaving 1,500 people dependent on food aid from the mainland.

29. Historical climate records show that Africa has already experienced a warming of 0.7ºC, with global models predicting a further increase at a rate of 0.2–0.5ºC per decade (IPCC, 2001). There are also observed changes in rainfall distribution with decreased rainfall expected in the Sahel and an increase for central Africa. Further physical impacts include sea-level rise, changes in temperature extremes (such as heat waves), and an increase in the frequency and intensity of storms. Such physical impacts combined with a high dependence on natural resources and an overdependence on rainfed agriculture mean that many African countries face high vulnerability in the coming decades. Poverty, inequitable land distribution, conflict, HIV/AIDS, and debt also mean that many African countries lack the adaptive capacity to cope and adjust compared to more developed countries.

30. In Asia, the key concerns relate to water stress, impacts on agriculture and food security and sea level rises in coastal areas, all of which will affect human development. Professor Rajendra Pachauri, the Chairman of the UN's Intergovernmental Panel on Climate Change indicated that climate change could result in millions of migrants and refugees by 2050. He noted that Bangladesh alone stands to lose 17 per cent of its territory within 45 years. As a low-lying Least Developed Country with an extensive coastline, Bangladesh is highly vulnerable and facing a scarcity of fresh water due to less rain and higher evapo-transpiration in the dry season; drainage congestion due to higher water levels in the confluence with the rise of sea level; river bank erosion; frequent floods and prolonged and widespread drought; and wider salinity in the coastal zone.

31. In examining the needs of Commonwealth countries that are highly vulnerable to climate change, this paper focuses particularly on small states, African countries and other Least Developed Countries (LDCs) that face both a high level of physical vulnerability (exposure to risk) as well as significant adaptive capacity constraints. Adaptation concerns of these member states are reviewed below, by sector. The capacity building and technical assistance needs that arise from these concerns are then considered in the final section of this part of the paper.

2. Adaptation Concerns of Least Developed Countries and Small Island Developing States

a) Food Security, Agriculture and Fisheries

Agriculture

32. The agriculture and food security sector in most developing countries is the sector most at risk from the impacts of climate change. A recent report from the UN Food and Agriculture Organisation states that "in some 54 poor developing countries, with a combined population of 2 billion, including 450 million undernourished people, production losses due to climate change may drastically increase the number of undernourished people, severely hindering progress in combating poverty and food insecurity".

33. Climate change impacts on agriculture and livestock will depend on changes in temperature, precipitation, sea-level rise (leading to salinisation of croplands), and climate variability (such as erratic rainfall, floods, droughts, and ENSO-related events (El Niño

Southern Oscillation). The complex interaction of these variables make it difficult to predict how climate change will impact at the regional level; although regional modelling is becoming increasingly accurate. “One generalisation is that, in most cases, the existing disparities in crop production between developed and developing countries [are] estimated to increase”. Many African countries, especially in Southern Africa, are likely to experience shorter, drier growing seasons, and possibly more frequent drought that would undermine crop productivity and worsen existing water stress. This is not helped by the fact that research in this area tends to favour commercial agriculture, with significant research gaps on subsistence farming.

34. Climate change deserves particular attention within agriculture as it poses a significant threat for regions already experiencing declining yields and per capita food production. Most of the Commonwealth Asian members, including Bangladesh, India, Sri Lanka and Pakistan, are predominately agricultural economies and their large populations depend on this sector for livelihoods. In India, roughly 64 per cent of the population is dependent on agriculture. Crop production in India takes place in almost all land class types, namely, dry, semi dry, moist, sub humid, humid, fluvisols and gleysols. Agriculture will continue to be important in India’s economy in the years to come, feeding a growing population, employing a large labour force, and providing raw material to agro-based industries. In East Africa, nearly 80 per cent of the population depends on agriculture which, in turn, contributes to 40 per cent of the region’s GDP. Climate variability, especially rainfall, is a major constraint to productivity, competitiveness and commercialisation of crops and livestock systems in east Africa; more so as 90 per cent of staple food production comes from rainfed farming systems. In most cases, it is temporal variations in rainfall, rather than total the amount, which threatens agricultural systems. For example, in 2005, Zambia experienced plentiful rains early in the maize growing season. Despite this, the variability and timing of these rains failed at critical times and yields declined by 32 per cent from the previous season.

35. Within each country, poor smallholder farmers are most vulnerable to climate change as they are more dependent on rain-fed agriculture and have few alternatives for adaptation. In Kenya, rising temperatures may limit the land suitable for growing tea, a major export commodity for the country. Large estates may afford additional irrigation and other technology for adapting, but 60 per cent of the country’s tea is grown by smallholder farmers who will struggle to meet such costs. In general, irrigation will be expensive due to reduced river runoff and the vulnerability of shallow wells, which necessitate the development of deep wells instead.

36. In Tanzania, declining trends for key agricultural crops have also been documented. Climate change models indicate that droughts will become more frequent, a trend already observed since the mid-1990s. In Tanzania, areas receiving bimodal rainfall (two rainy and two dry seasons in a year) are expected to see an increase in rainfall, while those with unimodal rainfall patterns (one rainy season and one dry season) are likely to experience reduced precipitation.

37. While a changing climate may favour certain crop species, those such as maize are predicted to decline. The CERES maize model shows that yields in Tanzania may decline by a staggering 33 per cent and up to 84 per cent, for central areas. This is largely due to reduced runoff for river systems such as the River Pangani, which is projected to decline in annual flow by 6-9 per cent, and River Ruvu by 10 per cent. The impact on food security is

exacerbated by the fact that maize, and other crops such as rice, which have been the focus of commercial and international research programmes, are replacing more traditional drought-resistant species such as millet. Agricultural policy, research and resource allocations must take account of climate change models to minimise impacts on food security and seize opportunities offered by more traditional and alternative crops.

38. Even in regions such as central Africa where rainfall is projected to increase, there will be other climatic changes that can offset potential benefits. For example, where there is already poor land management, climate change impacts on ecosystems may further exacerbate leaching of nutrients, washing away of topsoil and water logging, all of which affect crop development and total yield. Climate change is also likely to increase the incidence of disease and pests among crops and livestock due to increased temperature and rainfall. In such instances, farmers are likely to use more agrochemicals and disease resistant cultivars if they can, which will increase their costs. Climate change is likely to affect harmful animal diseases, such as Rift Valley Fever, tick borne diseases, as well as outbreaks of pests such as locusts. The Sahel locust outbreak in 2004 is but one tragic illustration of how climate-dependent pests can devastate local economies and livelihoods.

39. Livestock will also be impacted as optimal temperatures and pasture change with the climate. Special attention must be paid in communities where animals form an important part the local economy and livelihood. Increasing ground surface temperatures, changes in rainfall and pastureland, and the incidence of disease and pests will all impact livestock production in countries such as Tanzania, Lesotho, Malawi and Uganda. For example, in the National Communications for Uganda under the UNFCCC, drought was cited as a source of conflict within the country as families search for pasture and water across local borders. Vulnerability assessments must target local groups where cattle and dairy production are key livelihood concerns.

40. Small islands states have limited arable land and many already suffer from land degradation and increased soil salinity. In the Marshall Islands, farmers have resorted to growing crops in old oil drums to avoid planting in saline soils. Rising sea levels will increase coastal erosion and salt-water intrusion, as well as the risk of storm surges. In extreme cases, hard technologies may be the only option for saving agricultural lands, and even then, it is often difficult to anticipate appropriate adaptation measures. In the Caribbean, more intense wet seasons and severer and longer droughts during the dry seasons are predicted. Under such dry conditions, planting dates become even more critical as well as irrigation necessary to maintain adequate crop yields. For example, both nutmeg and banana production are positively correlated to annual precipitation. In the case of a 10-20 per cent reduction in precipitation, banana production will require improved irrigation schemes to continue. The effect of increased temperatures would further exacerbate the situation through increased evapotranspiration and reduced soil water.

41. In terms of adaptation in the agriculture sector, better climate forecasting and downscaling of global models are the first step. Knowledge dissemination (particularly in local languages and through local networks) is an important step to empowering farmers and strengthening their adaptive capacity. To illustrate, Rao and Okwach (2005) found that farmers in Machakos, Kenya could obtain an average increase in maize yield of 61 per cent if they accessed climatic outlook information and used such information in adjusting their cropping management. Other strategies included strengthening Agricultural Ecological Zone (AEZ) mapping for livestock, focusing on biodiversity within agriculture, and improvements

in harvest storage. To facilitate this, technical and capacity-building workshops can aid local-level and regional adaptation. Lastly, public-private partnerships and diversification of local incomes are some long-term strategies.

Fisheries

42. Marine ecosystems remain the backbone of island economies and are a key source of protein for coastal communities in general. There is much evidence to predict that climate change will further impact marine environments including coral reefs, mangroves and sea grasses; subsequently, threatening local fisheries. Coral reefs, in particular, have received much attention – often cited as playing a vital warning role about climate change impacts. Coral reefs have a narrow temperature tolerance and coral bleaching is already a global phenomenon especially in the Caribbean ocean. It is predicted that in the coming decades, the thermal-tolerance of reef-building coral will be exceeded due to rising sea temperatures. Coral reefs are a vital ecosystem for supporting local fishing economies, tourism, beach sand, building materials, and acting as natural breakwaters. Conservation of existing coral reefs is urgently needed as rising sea temperatures may forever damage these ecosystems.

43. Fisheries will also be impacted through changes in the ENSO cycles. During El Niño events, many islands such as Grenada experience reduced fish production. For example, during the most severe El Niños of 1982/83, 1986/87, 1991/92 and 1997/98, fish production was reduced by 25-60 per cent in Grenada.

44. Lastly, warmer sea temperatures may increase the incidence of algae blooms. Large-scale algal blooms deplete oxygen levels in the water and lead to large-scale “fish kills” which can last many months and wipe out local fisheries. Especially in regions such as the Caribbean where eutrophication is a serious environmental problem, attention needs to be paid to the climate impacts on algal blooms.

b) Desertification

45. Desertification is a loss of biological and economic productivity of very dry lands, which can lead to food insecurity and economic hardship. These are often the subject of drought (a natural phenomenon) and large fluctuations in the climate across seasons and across many years. The degradation of dry lands is occurring in a number of areas through unsustainable human activities often driven by poverty, including over cultivation (or cultivation of very marginal lands in inappropriate ways), overgrazing, deforestation and poor irrigation practices. As land becomes degraded it becomes less resilient to variations in the climate.

46. For Africa, desertification has already reduced the potential vegetative productive lands by 25 per cent. As such, it poses a critical threat to sustainable resource management in arid, semi-arid, and dry subhumid regions, undermining food and water security. Climate change has the potential to accelerate this through reductions in average annual rainfall, runoff, soil moisture, and through changes in solar radiation and winds. The regions of southern, North, and West Africa are most at risk.

47. There is wide debate over the importance of climatic and anthropogenic factors in causing desertification. Some scientists argue that anthropogenic factors outweigh climatic factors, though others maintain that extended droughts remain the key factor. Despite this

debate in the literature, climate change and desertification remain inextricably linked because of the inter-relationships between land degradation and precipitation. Desertification concerns are being addressed at the international level through UN Convention to Combat Desertification.

c) Water Resources

48. Water resources are widely recognised as highly vulnerable to climate change. Evidence shows that those countries already facing water stress (in addition to water scarcity) will be particularly hard hit by changes in the hydrological cycle. Despite advances in regional modelling, predicting climate change impacts on water resources is exceedingly difficult, in part because water resources are not only shaped by the hydrological cycle but changes in population, technology, and the social, economic and political landscape. Rising population, urbanisation, pollution, changing agricultural sectors, and institutional and legislative conditions are only some of the diverse factors that ultimately determine future water demands. That being said, the physical impacts of climate change on Africa's water resources will be significant, and will only add further uncertainty to water resources management.

49. Water is a major issue for several of the Commonwealth Asian members and will have significant impacts on agriculture and food security. In the case of Malaysia, water availability particularly in the dry season has been a major problem. It has been stated that areas prone to drought can become marginal or unsuitable for the cultivation of some of the crops, such as, rubber, oil palm, cocoa and rice, thus posing a potential threat to national food security and export earnings. Pakistan too, is concerned, and has given water resources due importance because of the possibility of extensive impacts of climate change on the sector.

50. The major rivers of Africa are highly sensitive to climate variation; with average run-off and water availability predicted to decrease in the Mediterranean and Southern Africa. At present, trends in major river basins indicate a declining run-off of 17 per cent over the past decade. The IPCC concludes that climate change will lead to an intensification of the hydrological cycles affecting both ground and surface water supply. Changes in temperature, the frequency and intensity of precipitation and timing of runoff, as well as the intensity of floods and droughts will all have regional impacts on water supply and water quality. This, in turn, will affect domestic and industrial water supply, irrigation, hydropower, navigation, ecosystems, and tourism. The impact on irrigation is especially important since agriculture currently accounts for roughly 70 per cent of water consumption worldwide, with the UN projecting a 50-100 per cent increase in irrigation water by 2025.

51. To illustrate, increased summer continental drying will cause more frequent and severe droughts especially in continental interiors in Africa. Higher maximum temperatures and more 'hot days' will lead to increased evapotranspiration and reduce water quality. More intensive precipitation events are predicted over many northern hemisphere and mid-to-high latitude areas which will cause more frequent and severe flooding. For example, East African lakes such as Victoria, Kyoga, Albert and Tanganyika are sensitive to climate variability and changes in flooding can disrupt economic activities along the shores. For some countries like Uganda, limited information is available for such flooding despite their frequency in the lower valleys and landslides in mountainous areas.

52. Integrated water resource management provides a framework to analyse and integrate climate change impacts into long-term planning. However, even in parts of Africa where rainfall patterns have changed leading to more flooding or droughts, insufficient data analysis has prevented trends to be established in some areas. Improvements in the monitoring and modelling are necessary to give resource planners the information to mainstream climate change impacts in their activities.

53. Small islands states generally have limited natural resources, which may have been further degraded through unsustainable development. Relatively thin water lenses also make the impacts for water resources a particular area of concern. For SIDS, poor infrastructure, limited human and financial resources, highly sensitive economies, and population density all exacerbate vulnerability. Historical records show a rise in sea-surface and air temperatures, particularly for the Caribbean. Observational data indicate that the Caribbean and Pacific have already experienced a rise of roughly 0.5ºC since 1900. For the Caribbean, night time temperatures are likely to increase more than daytime which would also increase humidity levels. For the Pacific basin, models such as the Hadley model predict a warming of the sea-surface temperature and air temperatures of 1°C per 20-45 years. The eastern tropical Pacific is projected to warm more than the western tropical Pacific.

54. Rainfall is notoriously difficult to predict; although our scientific understanding and regional models are improving. For the Pacific, an increase in sea-surface temperatures produces more moisture, especially along the equator and during the summer months, which in turn, would increase rainfall. The same is projected for the western Caribbean. In contrast, models indicate drying conditions for the eastern Caribbean and the Mediterranean (i.e. Cyprus and Malta). The El Niño Southern Oscillation (ENSO) is also predicted to change which would have an enormous impact for island states. Global Circulation Models point towards a greater warming of the eastern central Pacific, greater than the global average. In addition, since 1977, warmer and more frequent El Niño episodes have been recorded relative to its opposite phase, La Nina. This has brought increased rainfall in the northeast Pacific and decreased rainfall in the southwest Pacific. Past El Niños have caused water shortages and drought for Papua New Guinea, Samoa, Tonga, Kiribati and Fiji. More frequent El Niño events also bring increased risk of tropical cyclones, particularly for islands such as Tuvalu, Samoa, and Tonga.

d) Access to Energy

55. Energy is a critical sector for all developing countries, and is important in climate change from both mitigation and adaptation perspectives. The sector is a key source of emissions of greenhouse gases, but it is also at risk from climate change in the hydropower sector. Improved access to renewable energy sources by the poor is an important adaptation concern as it will help to relieve pressure on ecosystems that are currently being over-exploited for biomass fuel. In future, biofuels will become an important source of income in the agriculture sector of developing countries.

56. Hydroelectric power facilities are a major source of energy for many African countries and a source of economic development. However, reservoir storage, especially in East African lakes, has been shown to be sensitive to variations in runoff and periods of drought. For many countries such as Kenya, lake storage and major dams have reached critical levels, threatening industrial activity. In part, the trends reflect unsustainable management of watersheds in the past, but “model results and some reservoirs and lakes

indicate that global warming will increase the frequency of such low storage as a result of flooding or drought conditions that are related to ENSO". Furthermore, mountain glaciers (such as on Mount Kenya and Kilimanjaro) are receding with global warming. As sources of some of the most important rivers (e.g. on which hydro-electric dams are located), reduced flows with long-term climate change would mean new challenges not only to the energy sector but also for whole economies.

57. In addition to climatic changes, tree cutting and poor watershed management has increased the siltation of dams causing serious problems for hydropower. Conversely, afforestation and improved management of technology will increase adaptive capacity and improve hydropower generation.

e) Human Health

58. The potential impacts of climate change on human health are amongst the least understood of climate change impacts, although a few studies have been carried out (e.g. in Bangladesh on floods and in Kenya on Malaria). Nevertheless, such impacts were identified in several regions as being a major information gap.

59. The World Health Organization has acknowledged that climate change will have major consequences for human health. As seen with other health problems such as HIV/AIDS, malaria and tuberculosis, the poor will bear the brunt of climate-related illnesses resulting from heat waves, air pollution, water-borne diseases, and malnutrition. The table below summarizes the health implication of climate change.

60. Water-borne diseases are a particular risk for many African countries. In Tanzania (1997), heavy rainfall and flooding led to 40,000 cases of cholera, a huge increase beyond the 1,460 cases the previous year. The human casualty rate was 2,200 (compared to 35 deaths the year before). As to be expected, the result for the economy was also significant though there were unforeseen consequences for sectors not thought to be affected. For example, fish exports to Europe were refused because of the marine reservoir for the cholera bacteria. In general, warming of the African Great Lakes may create conditions that increase the risk of cholera transmission and other water-borne diseases for many nearby countries.

61. There is strong empirical evidence and models which predict an extension of ranges of infectious disease vectors. Much research has specifically focused on malaria as a climate-dependent disease. During periods of extreme temperature or altered rainfall, many areas have seen marked increase in malaria cases. Regions already struggling with malaria may experience sharp increases in the incidence of the disease. Most threateningly, several models such as the MARA model (Mapping Malaria Risk in Africa) predict an expansion for the range of malaria, with the disease now reported in new regions and at higher altitudes such as on the mountain plateaus in Kenya. The densely populated East Africa highlands are most at risk of climate change related increases in malaria transmission. In Asia, most vulnerable regions include coastal areas and the Ganges-Brahmaputra delta in Bangladesh.

62. Additional modelling has focused on other climate-dependent diseases such as dengue fever and some tick borne diseases, although not to the same extent as malaria. For example, Dengue fever transmission can follow increased water storage; and therefore, should be a priority for areas affected by drought and highly urbanized communities with poor water management and solid waste systems. In Fiji, changes in dengue-fever epidemics were

modelled using PACCLIM. It was found that climate change, through increasing temperatures, would lead to increases in the risk of epidemics. In addition, there is the potential to see a re-emergence of certain diseases in new locations. Furthermore, Rift Valley Fever is associated with increased rainfall while Meningitis with decreased rainfall and dusty conditions. The health implications of a changing climate are region-specific and much more work is needed in African countries to examine the implications for particular communities.

Health outcome	**Known effects of weather and climate variability**
Heat stress	• Deaths from cardiopulmonary disease increase with high temperatures • Heat-related illness and death increase during heat waves
Air pollution-related mortality and morbidity	• Weather affects air pollutant concentrations • Weather affects distribution, seasonality and production of aeroallergens
Health impacts of weather disasters	• Floods, landslides, and windstorms cause direct effects (deaths and injuries) and indirect effects (infectious disease, psychological morbidity). • Droughts are associated with increased risk of disease, and malnutrition.
Mosquito-borne diseases, tick borne diseases (i.e. malaria, dengue)	• Higher temperatures shorten the development time of pathogen in vectors and increase potential transmission to humans. • Each vector species have specific climate conditions (temperature, humidity) necessary to be sufficiently abundant to maintain transmission.
Under nutrition	• Climate change may decrease food supplies (crop yields, fish stocks) or access to food supplies.
Water-/ food-borne diseases	• Survival of disease organisms is related to temperature • Water-borne diseases are most likely to occur in communities with poor water supply and sanitation • Increases in drought conditions may affect water availability • Extreme rainfall can affect transport of disease organisms into water supply.

f) Coastal Areas and Infrastructure

63. Climate change will have a diverse set of impacts on coastal zones due to warming temperatures, changing precipitation, and sea-level rise. Likewise, the diversity of coastal zones allows for great potential in adaptation to climate change trends and variability. However, unsustainable human activity in coastal and marine systems means that many communities are at risk from climate change impacts and lack adaptive capacity. Examples of coastal zone impacts include:

- increased levels of inundation and storm flooding, which could threaten agriculture and coastal infrastructure, as well as human life;
- accelerated erosion of beaches, cliffs and wetlands;
- sea-level rise leading to seawater intrusion into fresh groundwater;
- floods and landslides due to heavier rainfall which can threaten coastal infrastructure and human life; and
- encroachment of tidal waters into estuaries and river systems impacting fragile coastal ecosystems and human livelihoods.

64. The vulnerability of coastal zones can be attributed to both geography and inappropriate development. Coastal settlements in areas such as the Gulf of Guinea and along the east-southern African coast face high physical vulnerability. Tanzania has an 800Km long coastline, which will face a diverse set of impacts and vulnerabilities from weather-related disasters and sea-level rise. A sea-level rise of 1m is projected to inundate 2117 square kilometers of Tanzania. Existing human settlements and coastal infrastructure will face increased risk, and with prohibitive costs for key technologies, it will be difficult to find low-cost adaptation solutions.

65. It is vital that coastal zone management recognizes climate risks and decreases exposure to those risks by incorporating projections of climate change impacts into development planning at all levels. Research capacity is also key: the initial National Communication of Tanzania under the UNFCCC highlighted the need for detailed studies of wave, climate and sediment transport. Such research will help estimate erosion, salinity and temperature variations necessary to predict sea level rise and valuation of all vulnerable structures along the coast to determine the best way of protecting them.

66. Adaptation options range from manageable planning policies such as changing building codes, future inland development, flood plain management, mangrove habitat protection and reforestation, restriction of sand mining, and strengthening existing structures such as docks. More costly measures include relocation and retreat of structures, raising bridges and roads, and building of sea walls and levees. In extreme cases such as the low-lying islands of the Maldives, it is estimated that the cost of protecting 50 of the 200 inhabited islands is over US$ 1.5 billion.

67. Mangroves are important as a natural barrier against erosion and storms. “Just as the degradation of wetlands in Louisiana almost certainly increased Hurricane Katrina's destructive powers, the degradation of mangroves in India magnified the [2004] tsunami's destruction" (Neil Burgess quoted in WWF press release). The slow rate of rising sea levels will allow mangrove ecosystems the possibility of migrating inland, but only when protection measures are put in place and dense utilization patterns accommodate the forests. There is, however, significant risk that hyper-salinity may also affect the growth of mangroves, and this, in turn would affect the marine life that depends on them for their breeding grounds.

g) Disasters

68. There is high confidence that climate change will increase either the frequency and/or intensity of precipitation events such as tropical storms and hurricanes. Warming temperatures result in more water moving through the hydrological cycle; and therefore, more precipitation and variability per event. It is also predicted that by 2100, there will be a 5–10 per cent increase in the wind speeds of tropical storms worldwide following a sea-surface temperature increase of 2.2°C. These are stark predictions considering about 90 per cent of all disasters are hydrometeorological in nature and small states face an increasingly turbulent future with impacts on human lives echoed by costs to infrastructure, property and economic activity. The impact of weather-related disasters can be 10–15 per cent of GDP – and in extreme cases, such as the impact of Hurricane Ivan on Grenada in 2004 – as much as 98 per cent of GDP. The costs of disasters are also rising. The UNEP estimates that severe weather costs amounted to $200 billion in 2005, the highest figure on record, compared to $145 billion in 1998. The Munich Re Foundation estimates that weather-related insurance claims worldwide in 2005 were $70 billion, well above the previous record of $45 billion set

in 1998. Clearly, this has implications for governments in their ability to finance investments that are necessary to drive development. The inherent connection between climate change and natural disasters is now a focus for research. The International Strategy for Disaster Reduction (ISDR), for example, is also actively working towards climate change adaptation within disaster risk reduction.

69. Following from this, the insurance industry is an important area and has long acknowledged the threat of climate change and dedicated resources for research and advocacy. As proposed by Ian Burton, the insurance industry could play a vital role in both spreading risk and risk reduction. Moderately priced and accessible insurance, changes in eligibility requirements, and rate incentives could all be used to promote adaptation measures. At present, the private insurance and reinsurance industry are, themselves, at risk to climate and seeking to reduce their exposure. Proposals have been made within the UNFCCC for fill in the gaps for climate-related insurance, though no meaningful action has been taken. Research is greatly needed in this area and, where insurance is being used to facilitate adaptation, lessons can be learned and applied elsewhere.

h) Tourism

70. For small island states, tourism is a driving force for local economies and central for development aspirations. Climate change is expected to affect tourism in many ways, both directly and indirectly. The loss of beaches due to erosion and inundation due to sea level rise would undoubtedly harm the tourism sector. Pristine beaches and coastal infrastructure such as hotel and airports are necessary to support tourism industries. Increased risk of storms and hurricanes would also dissuade potential visitors. Furthermore, the impact on ecosystems is of serious concern. Natural disasters can devastate ecosystems and wildlife that attract tourists. Preservation of coral reefs is also of major concern, especially for islands such as the Seychelles. In the case of Dominica after Hurricane David, the feeding and nesting sites of the island's endemic parrots were largely wiped out and the populations of two endangered parrots reached critical levels as low as 60 (*Amazona imperialis*) and 200 (*A. arausiaca*). There are also additional indirect impacts for tourism such as increased operating costs of hotels, with higher per capita water consumption and power consumption for air conditioning, and increased cost of insurance. Raising awareness among policy-planners and mainstreaming climate change into tourism development is vital for the long-term sustainability of these industries.

i) Ecosystems and Biodiversity

71. The links between climate change, ecosystem changes, and biodiversity are firmly established in the scientific literature and are being addressed internationally under the UN Convention on Biological Diversity and a number of other Multilateral Environment Agreements. Observed climate change, especially warmer regional temperatures, has already impacted biodiversity and ecosystems, causing changes in species distribution, population size, the timing of reproduction or migration events, and an increase in the frequency of pest and disease outbreaks. Climate change is projected to increase the risk of extinction for many species and the Millennium Ecosystem Assessment states that, "by the end of the century, climate change and its impacts may be the dominant direct driver of biodiversity loss and changes in ecosystem services globally". Such loss of biodiversity would impact rural livelihoods, tourism, and genetic resources – all with significant economic loss for many key countries in Africa.

72. Conversely, the further loss of biodiversity and ecosystem integrity will only increase the vulnerability of communities to the impacts of climate change. Functionally diverse systems are better able to adapt to climate change and a larger gene pool facilitates the emergence of genotypes which are better adapted to changed climatic conditions. As biodiversity is lost, options for change are diminished and human society becomes more vulnerable. The improved management of biodiversity hotspots, and actions to accommodate shifting ecosystem boundaries, are needed. Human/wildlife conflicts may also increase and should also be a focus of adaptation assessment.

j) Forests

73. Malaysia and many other countries have expressed their concern about the impacts of climate change on forestry resources, and the relationship between forest health and climate change needs greater research. For the most part, tree species have a limited capacity to tolerate changes in the climate. This is a key sector in many Commonwealth countries, both as a foreign exchange earner and in providing livelihoods and basic service to the poor. The forest sector will also be critical in implementing adaptation to climate change. Deforestation accounts for approximately 25 per cent of all annual CO_2 emissions yet forests possess the ability to 'lock up' carbon in their biomass and thereby offer the potential to help reduce the effects of climate change as well. Forests play an equally important role, often overlooked, of making natural systems more resilient. They provide stability to the critical ecosystem functions of water management and biodiversity conservation, and can provide much needed social support through provision of diverse and resilient livelihoods. In short, they can help reduce the vulnerability of people and environments to the effects of climate change.

74. While the combined forest cover of SIDS is insignificant in global terms, forests and trees on these islands are extremely important for the well-being of inhabitants. For most of the larger islands, forests also contribute significantly to the national economy and to international trade in wood and non-wood forest products. Because of their small land area, most SIDS are characterised by comparatively short distances between uplands and coastal areas. Under such conditions, forest ecosystems are critical as regulators of water supply (for consumption, irrigation and industrial uses and for generation of energy) in terms of both quantity and quality. In the Windward Islands all the water for household and industrial purposes is surface water taken from streams in the forest. Such water does not require complicated treatment nor does it require energy to transport it to the consumer, as it is gravity fed directly into the households.

75. By preventing erosion, forest cover is also important for the maintenance of soil fertility and the health of the marine environment. A problem of considerable concern in many islands is the high sediment load in rivers which, when deposited in the sea, smothers coral reefs and other coastal environments such as sea grass beds. Another protective role for forests in small islands, in particular in the tropics, is as a means of coastal protection. Tropical storms, hurricane and cyclones combined with high rainfall levels and storm surges are common occurrences in many islands. Forests act as buffers against the impacts of these and protect agricultural land from the effects of salt spray.

76. Most of the forests in Africa are being rapidly degraded, with immediate negative consequences for local populations, and ultimately with impact on global climate change and biodiversity loss. Africa accounts for about 17 per cent of the world's forests but for about 50

per cent of net recent global deforestation. Economics plays an important part in this process, yet increasing demand for water and declining water quality have also drawn attention to the important role that forests and woodlands play in protecting watersheds, and these functions becomes increasingly important under global warming.

3. Capacity Building and Technical Assistance Needs for Adaptation to Climate Change

a) Strengthening Sustainable Development Frameworks and Building Institutional Capacity

77. The discussion above has highlighted a basic concern about the adaptive capacity of highly vulnerable countries and the need for a stronger institutional and human resource base to ensure an effective response to climate risks. At all levels, climate change impacts need to be linked to delivery of the Millennium Development Goals (MDGs) and addressed in Poverty Reduction Strategy Papers (PRSPs). Effective natural resources management and environmental protection is also critical.

78. Climate-related disasters such as floods, cyclones and droughts are recurrent problems familiar to people and countries in each of the regions studied. In most countries there are existing institutional and other mechanisms in place to deal with early warning, relief and rehabilitation and recovery after such disasters occur. Although some of them have proven quite successful in the past (e.g. the cyclone warning system in Bangladesh), many of them are not necessarily working efficiently even in relation to current weather-related hazards, and are likely to be unable to cope with future hazards exacerbated by climate change. At national and sub-national levels there is a need to update (and in some cases establish) planning frameworks with respect to physical and land-use planning.

79. The analysis has also highlighted the need for strong research and technology capacities focused on critical sectors, and with resources and efforts targeted at adaptation and at the needs of the poor. Further research is needed in drought-resistant crops, the impacts of climate change on forests and ecosystems, and on cross-cutting issues such as gender impacts and security concerns.

b) Climate Scenario Building and Vulnerability Assessment

80. Much climate change science focuses on impact scenarios and is done using climate models. These models are increasingly being downscaled from global to regional levels. Such models operate over relatively long time scales, typically 50 to 100 years. It has been shown that there is a need to enhance capacities to use climate models at regional and national scales in vulnerable countries.

81. There is also a strong case for using the current generation of impact scenarios to trigger research on adapting to shorter-term climate risks. This can be done by assessing the risks of current climate impacts, such as floods, droughts or long term coastal zone salinity changes, on development plans, natural resources, and vulnerable communities. Skills are needed in these areas to cope with both present and future disasters.

82. Some attempts have been made to map the most vulnerable regions of countries from climate change impacts (e.g. to review ‘Hot Spots’) as well as from a range of stresses, as has

been done in India. Skills and approaches for vulnerability assessment and multi-hazard mapping need to be widely shared and developed, recognising that communities already adapting to changes that are occurring and can provide valuable perspectives and information.

c) Gender

83. Gender is another cross-cutting theme which has received little attention within research and policy. Environmental management is not gender neutral and it is important that climate vulnerability assessments adequately reflect the different circumstances of men and women within communities. Within the developing world, women represent the majority of low-income earners, with lower education levels, access to resources, and political participation. As a result, within many poor communities, women often face unique vulnerabilities and often more sensitive to climate change impacts. To illustrate, water shortages have significant implications for women and children as they are often responsible for water collection and treatment. Food security is another important issue with women being key roles with respect to crop production and decision-making. Women may also be more vulnerable in terms of health, with higher incidence of respiratory illnesses from exposure to toxic pollutants inherently associated with cooking and using poorer forms of energy such as biomass. After a natural disaster, women are often more economically insecure than men with out-migration having a huge social and economic impact on them. Following the Mozambican floods in 2001 and 2003, gender and child related vulnerability remained key characteristics of the magnitude and the devastating consequences of the flood.

84. For climate change impacts and vulnerability, much more gender-specific research is needed within all sectors. Gender-sensitive mapping can also be used for vulnerability assessments and designing appropriate adaptation measures. At present, gender relations are often paid lip service within climate change and development. However, it is vital that activities such as the Adaptive Policy Framework (APF) include gender issues from the initial stages onwards.

d) Security

85. Where countries and groups are highly vulnerable to climate change, societal impacts could include new or enhanced conflicts. These could be conflicts over water resources; or the result of large scale migration, as lands become increasingly infertile or populations are displaced by major weather-based events. Research, advocacy and an exchange of best practice is needed to better understand and address the potential security risks from climate change.

86. In 2003, the US Pentagon released a report acknowledging the potential for climate change to decrease global security. In particular, climate variability “could potentially de-stabilise the geo-political environment, leading to skirmishes, battles, and even war due to resource constraints” such as food shortages, availability of fresh water, and disrupted energy supplies.

87. Specific climate change impacts on security and societal conflict are difficult to predict because of the complex interaction of social, economic, political and ecological factors, and the various manifestations of conflict. For example, climate change is expected to undermine agriculture, especially in areas already experiencing food insecurity. This, in

turn, could lead to population migration and urbanisation. Large-scale migration may create or exacerbate conflict between groups, especially where ethnic tensions already exist and resources are scarce. Urbanisation may also create societal conflict within cities and increase crime. Where there exists socio-economic division within countries, climate change may encourage further resource capture of key resources, fuelling radical social movements. Overall, climate change may not "create entirely new social and security consequences, but more enhanc[e] existing instabilities". As a result, climate change adaptation measures should focus on existing conflict-prone and unstable regions where conflict may be exacerbated by a changing climate. Furthermore, research into social, political and economic adaptation measures, especially those that build institutional strength, fair legal codes of practice and the rule of law would go along way to minimise societal conflict from resource scarcity.

e) Funding

88. As we will see in Part II, adaptation to climate change is a growing area of international financial mobilisation. However, it is still far from clear what the best use of those funds is and whether the most vulnerable countries (and the most vulnerable people within most countries) can access the support they need.

89. There is a growing awareness about the role of forests in environmental stability. Most countries in Africa have forestry policies that reflect this and there are several initiatives that aim to enhance the environmental benefits from forests. However, many environment-related initiatives are dependent on external support, because of the lack of domestic funding. There are some limited efforts to support environmental conservation through payments for environmental services, but these are still in their infancy and it is difficult to draw any conclusions about whether they can be widely adopted. In future, carbon markets may provide a significant source of funding and support for reforestation efforts in member states. Pilot schemes and the exchange of best practice and approaches in this area would be valuable.

f) Local and Community-Based Issues

90. Many adverse climate change impacts will fall disproportionately on poor people. However, there are great knowledge gaps in terms of specifying exactly how, and more importantly where and when, those impacts will occur. The main approaches suggested to deal with this gap involve developing the capacities of local, national and regional level institutions to undertake long-term analysis of climate impacts and then link the findings to climate change projections.

91. Local communities, while being the most vulnerable to the impacts of climate change, are also the most difficult to reach in terms of appropriate messages. Their knowledge about climate change impacts may be quite low, but their knowledge of their own coping capacities and strategies for weather-related hazards is high. Yet, the value of local people's knowledge of weather-related hazards is considerable and needs to be harnessed effectively. For example in Kenya, local/indigenous 'shamans' may not have accurate prediction capabilities, but have nevertheless been used as useful channels for information dissemination. In view of these factors, it is particularly important to build the capacity of communities to become advocates for action and contributors to awareness raising. Information, education and communication technologies for community leaders and community members including young people have a positive role to play.

g) Role of Professionals

92. Most developing countries have a core of professional educators, planners and natural resource managers in key sectors. For example, Bangladesh is renowned for the quality and strength of its water resource managers, India for its agricultural professionals, and Kenya for its wildlife managers. However, adaptation to climate change is a newly emerging field and professionals have much to do in understanding the implications in their own fields and in developing approaches to address emerging concerns. They have much to contribute by sharing their knowledge and experiences and by updating the skills of their professions through the inclusion of disaster risk reduction and adaptation to climate change in the formal and on-going training opportunities for their professions.

PART II: INTERNATIONAL SUPPORT ON ADAPTATION TO CLIMATE CHANGE

1. The International Framework on Adaptation to Climate Change

93. Adaptation to climate change has been part of the United Nations Framework Convention on Climate Change (UNFCCC) since its adoption in 1992. This was largely due to the work of the Alliance of Small Island States (AOSIS) (Yamin and Depledge 2004). With the exception of some AOSIS countries, in the early 1990s climate change was considered too distant a threat by many developing countries for them to prioritize adaptation (Yamin 2005). This picture has now changed significantly and adaptation concerns have risen up the international climate agenda. However, progress has been hampered to some degree by three interrelated factors: a lack of consensus on the definition and meaning of adaptation; the limited ability of developing countries to assess their own vulnerability; and problems surrounding financing adaptation, in particular the issues surrounding 'incremental costs' and 'global environmental benefits' (Yamin and Depledge 2004).

94. Some adaptation provisions were agreed as part of the Marrakesh Accords that emerged from the seventh session of the Conference of Parties (COP 7) in 2001. These included important decisions that delineated instruments and mechanisms for supporting adaptation, and the establishment of three new funds: The Special Climate Change Fund is designed to support the implementation of adaptation activities where sufficient information is available; the Least Developed Countries Fund to support the preparation and implementation of national adaptation programmes of action (NAPAs), which will communicate priority activities addressing the urgent and immediate needs and concerns of the least developing countries, relating to adaptation to the adverse effects of climate change, and finally a third fund, the Adaptation Fund, was established under Kyoto Protocol.

95. Most recently a five-year programme of work has been agreed under the UNFCCC on impacts, vulnerability and adaptation to climate change. The goal is to assist governments to improve their understanding and assessment of impacts, vulnerability and adaptation, and decide on practical adaptation actions.

96. Under the Convention, the Global Environment Facility has supported adaptation-related capacity-building by providing a number of developing countries with financial support to undertake vulnerability and adaptation (VA) assessments. Moving beyond the `study' phase of VA assessments to getting adaptation projects and programmes moving on the ground has proved difficult, however, due to the incremental costs/global environmental benefits criteria described previously and by the lack of agreement about the relationship of Overseas Development Assistance to funds provided under the Convention. Individual countries will, of course, largely fund their own mitigation and adaptation projects.

a) NAPAs and National Communications

97. Currently, the most promising vehicles for integrating climate change and development policies are through the formation of National Communications, Assessments of Impacts and Adaptation to Climate Change (AIACC), and the National Adaptation Programmes of Action (NAPAs).

98. Under the UNFCCC, most developing countries have completed National Communications which outline impacts of climate change for their respective countries.

However, limited human and financial resources have meant that few have been able to complete additional National Communications to include in-depth proposals for adaptation. In response to this, the National Communication Support Programme (NCSP) developed an Adaptation Policy Framework to build capacity for research and prioritize adaptation policies. This is one example of the type of large-scale support programmes that exist.

99. National Adaptation Programmes of Action (NAPA) assist LDCs in meeting their adaptation needs. COP-7 formalised this process, by institutionalising the LDC Fund and an LDC Expert Group to help countries prepare their NAPAs. The rationale for NAPAs was recognition of the fact that many LDCs do not have the capacity to prepare and submit strategies for dealing with climate change and lack the resources to begin to adapt. Simply they provide a way for LDCs to tell others what they urgently need if they are going to be able to build resilience to climate change.

100. Guidelines initially set out by Parties to the UNFCCC in Marrakesh suggested that NAPAs should only use existing scientific and social scientific knowledge, without the need for new studies, but also incorporate local and traditional knowledge. Also, they should be compiled in a participatory way involving multiple stakeholders and be based on sustainable development, gender equality and simplicity. Apart from work under the UNFCCC, among others the UN Convention on Combating Desertification (UNCCD), Poverty Reduction Strategy Papers (PRSPs) and the 1992 Biodiversity Convention all address aspects of climate change adaptation. The existing country strategies for addressing these agreements should also form part of the NAPA.

101. The timetable for the completion of NAPAs is not formalised under the UNFCCC, however it was envisaged that most countries would completing their NAPA within 12 to 18 months of funding becoming available in 2003. This suggested that many NAPAs were due to be completed in 2005 and 2006. However, as of October 2006, only six NAPAs have been completed, though more are in the final stages of preparation. A review of the NAPA process by the LDC Expert Group conducted in October 2004 found LDCs considered most of the problems in preparing their NAPAs were logistical, in particular relating to the timely provision of funding. They also felt additional capacities could be enhanced to improve the NAPA preparation process, including technical training, funding, vulnerability assessment, information exchange, information technology equipment, criteria development for ranking and prioritization of projects, and project formulation.

b) *Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change*

102. A Five-year Programme of Work on Adaptation was adopted by the 11th Conference of the Parties in Montreal in 2005 with a view to helping Parties improve their understanding and assessment of impacts, vulnerability and adaptation; and make informed decisions on practical adaptation actions. The 2006 Nairobi Conference of the Parties finalised agreement on the initial activities to be undertaken in the first two years, up to June 2008 and renamed the 5-year Work Programme. Parties agreed to implement the programme through activities outlined in conclusions drawn up by the Subsidiary Body for Scientific and Technological Advice (SBSTA), which list nine areas for action:

- Methods and tools;
- Data and observations;
- Climate modelling, scenarios and downscaling;

- Climate related risks and extreme events;
- Socio-economic transformation;
- Adaptation planning and practices;
- Economic diversification.

103. As the list maintained by the UNFCCC Secretariat shows, there are many organisations working in areas related to the Nairobi Programme, but the following institutions are strongly engaged and would be key partners for the Commonwealth to work with: the Food and Agriculture Organization of the United Nations (FAO); the World Health Organization (WHO); the World Meteorological Organization (WMO); the Intergovernmental Panel on Climate Change (IPCC); the International Strategy for Disaster Reduction (ISDR); and the Organisation for Economic Co-operation and Development (OECD). Activities in the first phase focus on:

- Information gathering, exchange of experiences and identification of gaps on:
  - methods and tools for impact and vulnerability assessment;
  - adaptation approaches, strategies, practices and technologies; and
  - increasing economic resilience and reducing reliance on vulnerable sectors.

- Examining Parties and relevant organizations can work to improve:
  - climate data, observations and understanding of impacts;
  - availability and capabilities in using climate models;
  - assessment and management of climate-related risks and impacts; and
  - socio-economic aspects of climate change and their integration into vulnerability assessments.

104. The Programme will produce synthesis reports and workshops to share information and deepen understanding. It was noted that the funds required for the five-year programme of work were insufficient in the period leading up to the 28th session of SBSTA and that additional funding would be sought. A meeting will be held before the 28th SBSTA in 2008 to examine the outcomes of activities in the first period. This will be an important opportunity for Commonwealth member states to review the Programme.

c) *Support from International Organisations*

105. The Convention Secretariat, the UNEP and WMO support science and modelling, and sponsor workshops and training to bring together those in the respective fields. Other organisations such as FAO, WHO, World Bank, AfDB, ADB, and IADB also sponsor climate change work, drawing on their own strengths and capacity.

106. There are also important agreements outside of this framework, such as: the Asia-Pacific Partnership on Clean Development and Climate, which is focused on mitigation; and the European Climate Change Programme and the Climate Change Action Plan for the U.S. New England States and Eastern Canadian Provinces, which address both adaptation and mitigation.

107. In the past there have been concerns about the level of attention given to climate change concerns in the programmes of international donor organisations and governments. In 2001, a review of 136 GTZ funded projects in Africa found no references to climate change. Some international organisations such as the IMF and WTO still make few specific

considerations for climate issues in their operations, but in recent years, donor organisations and governments have begun increasingly to incorporate climate change into their development programmes. In 2003, a multi-agency report (published by AfDB, ADB, DFID, DGIS, EC, BMZ, OECD, UNDP, UNEP, and World Bank) affirmed the "central importance of climate change impacts and adaptation to achievement of their core mandate on poverty alleviation".

108. Organisations and governments such as the World Bank, GTZ, NORAD, DFID, and CIDA are now investigating the linkages between climate change and development assistance. The OECD Environment and Development Cooperation and DAC branch launched a six-country project in 2002 to explore the potential for mainstreaming adaptation into development assistance. The project revealed the magnitude of development assistance and aid into sectors potentially affected by climate risks. In Egypt and Bangladesh alone it was estimated that between US$1-2 billion was directed towards sectors affected by climate change and climate variability from 1998 to 2002. As much as 50–65 per cent of development aid in Nepal was given to climate-sensitive sectors. There are also many examples where specific development projects may be put in jeopardy due to climate change. In 1985, a glacial lake outburst in Nepal destroyed a World Bank funded hydropower dam in one single event (as luck would have it, just after it was completed). Glacial lake outbursts are expected to become more frequent under climate change as rising temperatures cause glacial retreat in the Himalayas. Such examples demonstrate the clear need to take into consideration the impacts and vulnerabilities of climate change into current and planned development programmes. Another important initiative that the Commonwealth could participate in is the World Bank's Vulnerability and Adaptation Resource Group (VARG) which is an open knowledge network on vulnerability, adaptation and development.

109. Despite such developments, there remain major obstacles for climate change funding. Most obvious is that, worldwide, climate change is under-funded. The major UNFCCC funds and those given by OECD countries do not come close to the estimated finances required for adaptation in less developed countries. Where the funds do exist, many governments find it difficult to access the funds due to complicated and protracted application processes. Private companies also report the same problems when accessing funds.

2. <u>Key Regional Initiatives</u>

a) Africa

110. Activities are principally organised in geographical arrangements such as the West African coastal countries of Gambia, Ghana, Nigeria, Cameroon, Sierra Leone; Southern African countries of Namibia, South Africa, Lesotho and Botswana as well as the East African countries of Kenya, Tanzania, Uganda, Zambia.

111. Major sources of International Funding Available for Adaptation in Africa are mainly provided by the following:

- The Global Environment Facility (GEF) Trust Fund is the financial mechanism of the UNFCCC. The Strategic Priority on Adaptation (SPA) is designed to reduce vulnerability and to increase adaptive capacity to adverse effects of climate change in the focal areas that the GEF works;
- The Special Climate Change Fund (SCCF); and
- The Least Developed Countries Fund (LDCF).

Projects:

112. **Regional water initiatives**: There are a number of regional initiatives for better water resource management that will facilitate the adoption of appropriate adaptation measures, for example the Regional strategic action plan for integrated water resources development and management in the SADC countries.

113. **Regional Climate Outlook Fora:** Since 1994 the US National Oceanic and Atmospheric Administration (NOAA), working with a number of partners, has set up a series of Regional Outlook Fora across Africa, with three fora covering West Africa, the Greater Horn of Africa and Southern Africa (SADC region) respectively. The Regional Outlook Fora bring together a range of national and international meteorologists to produce probabilistic, consensus-based seasonal forecasts in addition to information users.

114. There are a number of **research institutions** that seek to increase better understanding on adaptation to climate change to improve government policy and response to the impacts.

115. **Consultative Group on Agriculture Research (CGIAR):** The CGIAR has many research centres located around the developing world. The CGIAR has also been running a 'Climate Change Challenge Programme' that has developed useful research findings particularly on crop and livestock management in semi-arid and dry lands.

116. **African Monsoon Multidisciplinary Analysis, (AMMA) Project:** AMMA is a multiyear project with a focus on West Africa. It involves research and systematic observation to improve understanding of climate change and its impacts on health, food security, and water resources.

117. **Assessments of Impacts and Adaptations to Climate Change (AIACC):** AIACC was developed in collaboration with the UNEP/WMO and IPCC and funded by the GEF to advance scientific understanding of climate change vulnerabilities and adaptation options in developing countries. By funding collaborative research, training and technical support, AIACC aimed to enhance the scientific capacity of developing countries to assess climate change vulnerabilities and adaptations, and generate and communicate information useful for adaptation planning and action.

118. **Climate Change Adaptation Support Programme for Action-Research and Capacity Development in Africa (CCAA) programme:** A collaborative programme between the International Development Research Council (IDRC) Canada and the UK Department for International Development (DFID), it supports African countries in their efforts to address vulnerability, particularly of the poor, to climate change. Building on current activities and experience, the CCAA programme strengthens efforts to establish and maintain a skilled body of expertise in Africa to support efforts to cope with climate variability and change with a focus on the poor. It funds research and strengthens the capacity of African scientists, research organizations, governments and civil society to assess vulnerabilities.

119. **Linking Climate Adaptation network (LCA)** aims to be a community-led adaptation by assisting communities, policymakers, practitioners and academicians to share knowledge on climate change adaptation and is funded by DFID. The network identifies longer-term research priorities needed to support community led adaptation in the future.

Other activities include; website on research areas; exploring the value of NAPAs; and exploring climate policy and links between climate change and disaster communities.

120. **Regional and International Networking Group (RING)/CLACC** is a well-established network of research and policy related institutes on issues of sustainable development**.**

121. **The New Partnership for Africa's Development (NEPAD),** an African-led strategy for sustainable development and poverty reduction in Africa. The NEPAD Secretariat is developing an implementation plan and building linkages with existing regional organisations such as the Economic Community of West African States (ECOWAS) and Southern African Development Community (SADC). The Secretariat has engaged with other African organisations, such as the UN Economic Commission for Africa (ECA) and the Africa Development Bank (AfDB), to elaborate proposals in support of NEPAD priorities.

Projects

122. Currently, there are a number of adaptation building pilot initiatives, designed to eventually build regional capacity Africa-wide (as well as national) mainly funded under the GEF SPA and SCCF.

123. **Incorporating Climate Change in Integrated Water Resources Management in Pangani River Basin, Tanzania**. A SCCF supported projected. These frameworks will address climate change and pilot adaptation measures. It is a field-based climate change preparation project with strong links to basin and national planning and policy which will help build national and regional capacity in water resources management.

124. **Coping with Drought and Climate Change**. This regional GEF SPA funded project, aims to develop and pilot a range of coping mechanisms for reducing vulnerability of farmers and pastoralists to future climate shocks. Components include piloting coping strategies, improving early warning systems, assisting governments in developing drought plans and integrating climate change/drought across sector policies and finally replicating and disseminating the results. The project is ongoing in Kenya, Mozambique (amongst other Southern African countries.)

125. **Adaptation to Climate and Coastal Change in West Africa (ACCC)**, Regional GEF SPA funded project which aims to perform adaptation actions in pilot sites particularly vulnerable to natural climate changes and to anthropogenic degradation in the short, medium and long term and seeks to formulate national and regional adaptation strategies to help manage the impact of changes to the shoreline within the framework of Integrated Coastal Zone Management. The project will run four years from 2007-2010 and is taking place in Gambia (as well as other West African coastline countries).

126. **Integrating Vulnerability and Adaptation to Climate Change into Sustainable Development Policy Planning and Implementation in Eastern and Southern Africa, Regional**. This project aims to contribute to the mainstreaming of adaptation to climate change into development planning and implementation in southern and eastern African countries. The mainstreaming of adaptation will occur at the project or field level as well as through integration of broader policies related to development priorities. Projects will be

carried out in Kenya, Mozambique (and Rwanda) with Tanzania (and Madagascar) as observer countries and is funded through the SPA.

127. **Community-based Adaptation (CBA) Programme, Global, including Namibia** This project is aimed at: (i) developing a framework, including new knowledge and capacity, that spans the local to the intergovernmental levels to respond to unique community-based adaptation needs; (ii) identifying and financing diverse community-based adaptation projects in a number of selected countries; and (iii) capturing and disseminating lessons learned at the community level to all stakeholders, including governments. This project is to be funded through GEF's SPA and to be implemented by UNDP.

128. **MANDISA: South Africa** is the programme for Monitoring, Mapping and Analysis of Disaster Incidents in South Africa (MANDISA) and is a core activity for the Disaster Mitigation for Sustainable Livelihoods Programme of the University of Cape Town (DiMP). MANDISA focuses on South African-relevant losses including large urban 'non-drainage' floods; wildfires and extreme wind events, as well as highly frequent 'small' and 'medium' fires. Socio-economic and environmental risk factors that affect disaster impact are included where possible, allowing the potential for tracking the developmental conditions that prefigure disaster. MANDISA is viewed as an approach rather than a disaster-tracking IT tool.

129. **The World Hydrological Cycle Observing System (WHYCOS) project** aims to provide information to improve efficient management of the world's water resources. It is based on a series of regional projects providing technology and training to monitor hydrological parameters (rainfall, riverflow and evaporation) in the world's river basins. In Africa, there are two projects; in West/Central Africa (AOC-HYCOS funded by the French Ministry for Foreign Affairs), and Southern Africa (SADC-HYCOS funded by the EU).

b) Caribbean, Indian Ocean, Pacific

Caribbean Institutions

130. The Central organisation for co-ordinating projects in the Caribbean region is **Caribbean Community Climate Change Centre (CCCCC)** located at the University of Belize which was established to further develop the human and institutional capacity of the Caribbean Region to deal with the negative consequences of climate change on a long-term basis.

131. The Centre implements projects designed to prepare for and reduce the harmful effects of climate change and sea level rise and seek ways in which the Caribbean Community can benefit from any opportunities that may result from climate change. Additionally, the CCCCC is intended to position the region to maximize benefits from new and additional resources arising from the UNFCCC.

<u>Major Projects</u>

132. The main project currently being undertaken by the CCCCC is 'Mainstreaming Adaptation to Climate Change (MACC)'. This followed on from the initial work carried out under the Caribbean Planning for Adaptation to Climate Change (CPACC) Project.

133. Established in 2004, MACC has a budget of around US$11 million with the Global Environment Facility contributing close to half of these funds. The remainder is contributed by CCCCC member governments. MACC is made up of five components:

- *Building Capacity to assess vulnerability and risks associated with climate change:* mainstreaming adaptation methods into national development planning and public and private sector strategies;
- *Building capacity to reduce vulnerability to climate change.* Supporting formulation of a regional strategy, specific measures for adaptation, and pilot schemes;
- *Build capacity to effectively access and utilize resources to reduce vulnerability.* Expanding the knowledge base to facilitate global climate change impact assessment as a basis for decision making on adaptation;
- *Public education and outreach*; and
- *Project management.* Supporting CARICOM. Project administration, as well as planning, monitoring and evaluating activities over the duration of the project.

Other Projects

134. The World Bank and GEF have recently agreed to sign a US$2.1 million grant for the Special Program on Adaptation to Climate Change (SPACC) Project. Total funding for the project is US$5.5 million and it is designed as a pilot adaptation programme to protect coastal areas in the Caribbean. The project will be carried out in sites in Dominica, Saint Lucia and Saint Vincent and the Grenadines and is intended to show how adaptation planning and assessment can be practically translated into national policy, sustainable development planning and poverty reduction. Activities include:

- Completion of an integrated natural resource management plan, including climate change concerns for one island and incorporation of the results into the national planning process;
- Incorporation of lessons on strengthening key infrastructure into local hazard management plans and building guidelines;
- Stabilization of the population of threatened mangrove stands
- Stabilization of the diversity of coral reefs and associated species;
- Preservation of ecosystem functioning in two national parks; and
- Maintenance of the health of coastal ecosystems.

135. A final development is that all the member countries of the CCCCC have written their first National Communications which is part of the agreement countries made to join the UNFCCC. These National Communications evaluate all aspects of a countries contribution to climate change along with specific vulnerabilities and planned adaptations. The quality of these National Communication varies considerably. Currently all of the CCCCC countries are in the process of drafting their second communication. St Lucia has written a National Climate Change Policy and Adaptation Plan which is more specific about the steps which the government plans to take.

Indian Ocean Region

136. Commonwealth countries of the Indian Ocean region (Maldives, Mauritius and Seychelles) have received some assistance from various funding agencies including GEF, UNEP, World Bank and UNDP to address climate change issues on an *ad hoc* basis.

However, unlike the Pacific and Caribbean regions, no regional strategy or framework has been put into place for this purpose. However, a proposal for a global climate change adaptation programme for small island developing states is currently being explored with the World Bank and the United Nations Environment Programme. This would include provisions for the establishment of a regional climate change adaptation programme for participating states in the Indian Ocean region (Comoros, Madagascar, Maldives, Mauritius and Seychelles).

137. Commonwealth countries in the region have already identified adaptation strategies to mitigate climate change impacts. It is recalled that it was President Gayoom of the Maldives who played an important role in bringing the issue to the attention of the world community during his historical addresses on climate change at the UN General Assembly, the Commonwealth Heads of Government meeting in Vancouver and the SAARC Summit meeting held in 1987. On the request of the President, the Commonwealth and the SAARC established experts groups to study the impacts of Greenhouse gases and global warming on socio-economic sectors. The establishment of a regional body/programme to address climate change is vital but budgetary constraints and other priority concerns have precluded the formation of such a body.

Projects

138. All the three countries – Maldives, Seychelles and Mauritius – have submitted their Initial National Communications to the UNFCCC in 2001, 1997 and 1997 respectively followed this with the preparation of Climate Change Action Plans (CCAP). Seychelles and Mauritius have completed their National Capacity Self Assessment and Technology Needs Assessment with funding from UNEP/GEF. They have identified mitigation and adaptation technology priorities, which can form the bases for a portfolio of environmentally sound technologies. Mauritius has just completed a stocktaking and stakeholder consultation on climate change activities with financial and technical support from UNEP/GEF prior to the preparation of its Second National Communication (SNC). Seychelles also is in the process of preparing its SNC. On the other hand, the Maldives are currently producing a National Adaptation Plan of Action with the assistance of UNDP.

139. Mauritius has submitted a proposal on Climate Proofing – a risk based approach to adaptation – in response to a call for proposal from UNITAR within the framework of Advancing Capacity to support climate change adaptation (ACCCA). This will enable risks to a development project to be identified as a consequence of climate variability and change and ensuring that those risks are reduced to acceptable level during the planning, design and preparation of a project. A few countries in the Pacific region have received funding from the Asian Development Bank to implement this project. In the Indian Ocean region, only the Maldives have recently received assistance to complete a case study to adapt to current and future climate risks.

140. Though some activities in the region to adapt to climate change have already been completed and others are underway, a concerted action is required to mainstream, in a comprehensible way, climate change into development planning. Actions to be taken and technologies required have been identified but the member countries lack the resources, both technically and financially to act alone. They will need a great deal of assistance from the international community to adapt to the challenge of climate change. Such an initiative could be co-ordinated by the Indian Ocean Commission (IOC). Mauritius, Seychelles, Comoros,

Madagascar and Reunion are members of the IOC and Maldives is member of the West Africa Indian Ocean, the Mediterranean and the South China Seas Small Island States (AIMS) group, which is co-ordinated by IOC.

Pacific Institutions

141. There are two key institutions in the Pacific promoting a regional response to climate change. These are the Pacific Regional Environment Programme (SPREP) and the South Pacific Applied Geoscience Commission (SOPAC). All Pacific Island Countries have drafted their First National Communications.

142. **SPREP**. Climate Change work comes under the Pacific Futures programme and is shaped by the Pacific Islands Framework for Action on Climate change 2006-15, founded on six principles: implementing adaptation measures; governance and decision making; improving our understanding of climate change; education, training and awareness; contributing to global greenhouse gas reductions; and partnership and cooperation.

143. **SOPAC** promotes sustainable development through an emphasis on disaster risk and alleviation. SOPAC's works to provide assistance to its member countries in three key programme areas: *Ocean and Islands, Community Lifelines* and *Community Risk.*

144. SPREP has traditionally supported Pacific Island Countries in their UNFCCC negotiations whereas SOPAC has focused on disaster management programmes. Some commentators have sought a more deeply integrated approach by these institutions to adaptation and hazard risk management. The World Bank has suggested that the Pacific Islands Forum takes a stronger leadership role in setting policy directions for implementing the regional framework. It has also suggested that: risk management of natural hazards should be an integral part of the Pacific Plan; and that specific environmental resilience targets be incorporated into the Millennium Development Goals of Pacific countries.

Major Projects

145. The major project in the Pacific Region under the auspices of SPREP is the Pacific Islands Adaptation to Climate Change Project (PACC) This project has a budget of US$82.4 million, with GEF funding US$11.6 million of this total.

146. This project will implement long term adaptation measures to increase the resilience of a number of key development sectors in the Pacific Islands to the impacts of climate change. The key sectors this project will focus on are: water resources management; food production and food security; and coastal zone and associated infrastructure.

147. To ensure project sustainability, regional and national adaptation financing instruments will constitute a fourth component. The project will focus on adaptation response strategies, policies and measures to bring about increased resilience in the region.

Other Projects

148. Another project which is nearing completion is the Pacific Islands Climate Change Adaptation Programme (PICCAP) which has a budget of US$2.44 million. This project was designed to enable Pacific Island Countries to meet their reporting obligations to the

UNFCCC, leading to the production of their First National Communications. It aims to build capacity within the region to advance national interests in relation to climate change, including capacity to effectively pursue energy and national resource management activities related directly or indirectly to climate change abatement and adaptation, and to take advantage of new opportunities related to the procurement of funding or projects related to climate change.

149. Kiribati is currently involved in a Pilot Adaptation Project. This is a GEF pilot/ demonstration projects under the Special Program on Adaptation that shows how climate change adaptation planning and assessment can be translated into national policy and sustainable development planning and action. The budget for the project is US$6.669 million with GEF providing US$1.899 million.

c) Asia

150. UNDP is working with 29 Least Developed Countries to prepare their NAPAs, and is also ready to assist them to implement the completed NAPAs. Currently, from the Asia region, only Bangladesh has completed their NAPA, for which US$200,000 was provided for the preparation by UNDP. A team is now place to start helping the Maldives with their NAPA.

151. Under the UNDP/GEF's Adaptation portfolio, on *'Strategic Priority on Adaptation Projects'*, UNDP has assisted Bangladesh on a *'Community Based Adaptations to Climate Change Program'*. The Strategic Priority on Adaptation programme is focused on ecosystems and synergies within the GEF focal areas of biodiversity, land degradation and international waters. Among the many projects that are being explored include integrated water resource management, which is focused on Small Island Developing States.

Canadian International Development Agency (CIDA)

152. In 2000, the Canadian government established the $100 million Canada Climate Change Development Fund (CCCDF) to promote activities addressing the causes and effects of climate change in developing countries, while helping to reduce poverty and promote sustainable development. The CCCDF was extended for 2005-2006, although it was only to be a five-year fund. Until 2005, the CCCDF had supported projects in over 50 countries, in addition to making a $10 million contribution to the LDCF.

153. CIDA, through CARE Canada and CARE Bangladesh, contributed $3 million (Canadian) for a project on *'Reducing Vulnerability to Climate Change'* between 2001 and 2005.

154. The aim of the project was to build the capabilities of low income households and community-based structures and networks to be able to respond to the negative impacts of global climate changes in a sustainable manner. The project was to work with 4,300 targeted beneficiary households to build their capacities to be able to innovate and respond to climatic changes, and with local NGO partners and networks in the Southwest to build the capacities of community based networks and their members to raise awareness and address the environmental changes that are occurring. Consequently, participating households and the institutions in the NGO sector that serve them, would be better prepared to address the

problems associated with extreme weather events such as salinity, flooding, drought, and potential rising sea levels induced by global warming.

Assessments of Impacts and Adaptations to Climate Change (AIACC) in Multiple Regions and Sectors

155. **AIACC** is a global initiative developed in collaboration with the UNEP/WMO Intergovernmental Panel on Climate Change (IPCC) and funded by the Global Environment Facility to advance scientific understanding of climate change vulnerabilities and adaptation options in developing countries. By funding collaborative research, training and technical support, AIACC aims to enhance the scientific capacity of developing countries to assess climate change vulnerabilities and adaptations, and generate and communicate information useful for adaptation planning and action.

156. AIACC is implemented by the United Nations Environment Programme and executed jointly by START and the Third World Academy of Sciences (TWAS). In addition to the funding from the Global Environmental Facility, collateral funding has been provided by the United States Agency for International Development, the Canadian International Development Agency, the United States Environmental Protection Agency, and the World Bank. Substantial in-kind support has been donated by participating institutions in developing countries.

Advancing Capacity to Support Climate Change Adaptation (ACCCA)

157. ACCCA invited proposals for projects in Africa and Asia by May 2006, that 'would identify and prioritise climate risks, assess available knowledge about risks and adaptation opportunities, develop risk communication The final award decisions would be made by November 2006.

158. Funding for a total of 9 projects is expected to be awarded of up to US$70,000 each. However, project development grants of up to US$5,000 were also available. Projects are expected to begin in January 2007 and be completed by June 2008.

159. The ACCCA project is jointly managed by the International START Secretariat in partnership with the United Nations Institute for Training and Research (UNITAR), the Stockholm Environment Institute - Oxford Office (SEI-Oxford), the Climate System Analysis Group of the University of Cape Town (CSAG-UCT), the Southeast Asia START Regional Center (SEA-START), the Temperate East Asia START Regional Center (TEA-START), and Environmental Development Action in the Third World (ENDA). Funding for the ACCCA project is provided by the EuropeAid Co-operation Office of the European Commission and by the UK Department for Environment, Food and Rural Affairs (DEFRA).

3. Conclusions

160. In the past couple of years there has been considerable progress in identifying climate change adaptation concerns, priorities and strategies: many countries have completed National Communications incorporating adaptation concerns; eight National Adaptation Programmes of Action (NAPAs) have also been completed by Least Developed Countries (LDCs); and adaptation concerns and projects have been identified through the work of significant regional GEF-funded programmes in the Pacific and Caribbean. While all these

efforts have produced a considerable number of strategies, there is still some way to go in translating these into concrete support for implementation. We have recently seen the agreement of major projects on adaptation agreed under the GEF in both the Pacific and Caribbean regions, but funding for adaptation projects remains a key challenge.

161. One of the achievements of the Nairobi UNFCCC meetings was the elaboration of modalities of the Adaptation Fund under the Kyoto Protocol. The Adaptation Fund (unlike other funds under the Convention and the Protocol, which are supported by developed country contributions), is supported by a two per cent levy on projects generating emission credits through the Clean Development Mechanism (CDM). There are some issues still to be resolved, but it is hoped the Adaptation Fund will become fully operational at the end of 2007. The fund is currently worth US$3 million but set to grow to around US$700 million by 2012.

162. The Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change is geared to helping countries improve their understanding of impacts, vulnerability and adaptation; and help them to make informed decisions on practical adaptation actions. It focuses on improving information flows and the evaluation of methods and tools. A database has also been established of local coping strategies under the UNFCCC to share experiences and knowledge from local communities in adapting to specific hazards.

163. International organisations and donor agencies have also begun to investigate the linkages between climate change and development and to address climate change concerns in their areas of comparative advantage. The international community is an important source of support for developing countries on research and data, though there is still a long way to go in improving capacities in these areas at the national level. The mainstreaming of climate change in international organisations and development agencies is especially important given the impacts that climate change will have in sectors addressed by development policy.

Critical Gaps to be Addressed

164. At the recent UNFCCC Africa Regional Workshop (Accra, September 2006), Dr Balgis Osaman-Elasha noted that poverty, weak institutions, a lack of technology and information, and poor access to resources and management capabilities in Africa compound the current situation of climate variability. The IPCC has also noted that there is a parallel between promoting sustainable development and increasing Africa's capacity to adapt to climate change.

165. Critical gaps occur in observational climate data and she noted the low coverage by the network of WMO World Weather Watch stations, a concern that was raised strongly by Commonwealth Meteorologists in 2005. Dr Osaman-Elasha suggested that a co-ordinated effort at capacity building, training, research and development is needed to ensure reliable climate observations which are also transformed into useful products for a wide spectrum of stakeholders. Education and awareness on climate change and adaptation is needed among governments, institutions, decision makers and the wider population. Greater stakeholder participation in the policy/decision making level – a more bottom-up approach – will support adaptation policies that accord with the needs of affected communities.

166. In their National Communications and NAPAs, Asian member governments highlighted critical gaps in education, training, financing, technical and institutional capacity needs, including:

- the inclusion of climate change in academic curricula at various levels;
- more active involvement of mass media in covering climate change issues;
- building capacities for implementing policy measures such as those for reducing vulnerability of various sectors and communities, disseminating and promoting climate-friendly technologies and initiatives, adaptation, and energy efficiency improvements; and
- sustainable financing mechanisms for research and actual projects for implementing climate change related policies and programmes.

167. Small states have made considerable strides in formulating adaptation policies and projects, and have recently attracted GEF funding for the implementation of a number of adaptation projects. This group in particular would benefit from inter-SIDS co-ordination and co-operation, to enable them to network and exchange experiences that are most relevant to the challenges they face. SIDS also face critical human resources and institutional capacity constraints.

168. The Commonwealth is well placed to support its most vulnerable member states to address a number of the critical gaps outlined above. This section has outlined many initiatives that the Commonwealth can complement, or work in partnership with, to:

- Promote the mainstreaming of climate change in the Commonwealth's own institutions;
- Support implementation of national adaptation strategies through institution building and technical assistance, particularly in the areas of climate scenario building, vulnerability assessment and practical action to take forward adaptation plans and programmes;
- Help practitioners to exchange experiences with others that face similar concerns and constraints, placing a particularly strong emphasis on learning-by-doing;
- Facilitate the integration of climate change into professional curricula and on-going learning opportunities for communities, young people, experts and government officials alike;
- Advocate the concerns of member states and of professional groups in their efforts to implement adaptation to climate change in their own countries; and
- Use the resource-base of grassroots institutions and the Commonwealth's strengths in the areas of education, gender, youth, and human rights that support a bottom-up, sustainable development approach to adaptation and disaster risk reduction.

169. These aspects are explored further in Part III of the paper, which outlines a Commonwealth role on adaptation to climate change.

Part III: Commonwealth Support on Adaptation to Climate Change

Commonwealth Mandates on Climate Change

170. In 1987 at the Commonwealth Heads of Government Meeting in Vancouver, President Gayoom of the Maldives described how unprecedented waves had caused great destruction in his country, a concern which found an eerie echo in the December 2004 tsunami. Heads "expressed serious concern at the possible implications of man-made climatic change, especially for low-lying and marginal agricultural areas" and called on the Secretary-General to examine the implications of rises in the sea-level and other natural disasters, including flooding. This lead to the establishment of a Commonwealth Expert Group under the chairmanship of Dr Martin Holdgate, a report entitled *Climate Change: Meeting the Challenge* which came out of a Commonwealth conference in Male in November 1989, and the publication in 1990 of *The Rising Seas* by Martin Ince.

171. The Commonwealth's early political work on climate change has been followed more recently by calls for assistance to help vulnerable member states to adapt to the changes. In Abuja in 2003, Commonwealth Heads of Government reaffirmed Commonwealth support through technical assistance to address the adaptation concerns of small island and other states that are particularly vulnerable to global warming and sea level rise. They also supported the efforts under the Convention to Combat Desertification and the Johannesburg Plan of Implementation to address climate and drought concerns, particularly in Africa.

172. In Malta, there were three relevant outcomes from the Commonwealth Heads of Government Meeting (25-27 November 2005). (1) Heads "noted with concern the adverse immediate and long term effects of climate change, biodiversity loss, water management issues, deforestation and sea-level rise on small island and other states that are particularly vulnerable to the impacts of global warming and sea level rise". They "called for co-operation and continued international efforts to address the specific challenges posed by climate change, in accordance with the principle of common but differentiated responsibilities and adaptation, including capacity building, and saw a role for the Commonwealth in progressing this agenda". They also called for international co-operation in addressing issues related to the transfer of affordable technologies and the management and promotion of renewable energy resources. (2) Heads called for action to increase capacity for disaster preparedness, early warning systems, risk mitigation and post-disaster recovery and reconstruction. These areas have significant links to adaptation to climate change. (3) Heads agreed a *Gozo Statement on Vulnerable Small States*, which among other things, recognises small states' particular concerns with natural disasters and the impacts of global climate change, and urges practical action to implement the Mauritius Strategy.

Elaborating a Response

173. In response to CHOGM mandates, the *Commonwealth Secretariat* initiated consultation in December 2005 with Commonwealth officials and invited experts in the wings of the Montreal UNFCCC COP/MOP. This saw strong support for a Commonwealth role in public education programmes and stakeholder engagement (youth, parliamentarians, professional associations, and women) on adaptation, as well as education and training of experts including the meteorological community. There was an interest in innovative areas of work, such as the cities agenda on adaptation to climate change, and adaptation in the tourism

sector. There were also calls for the Commonwealth to support a more integrated approach to disaster risk management, and to forge ahead with some pilot programmes on adaptation to climate change.

174. In May 2006, the Commonwealth Secretariat hosted further informal consultations in the wings of the UNFCCC meetings in Bonn. Members raised a number of issues, including:

- Wanting a simple technical assistance and capacity building needs assessment (presented as Parts I and II of this paper);
- Emphasis on securing practical assistance to deliver adaptation actions on the ground, the needs of individual countries should be brought-out in the assessment;
- Countries sought help in accessing finance for small clean energy and adaptation projects, either in the form of consensus-building, or through practical technical assistance; and
- A number of delegates stressed that the Commonwealth should develop a few small projects; mainstream climate change into its *existing programme work*; and identify CFTC resources that could open up new opportunities for member states to access training and technical assistance.

175. Likewise, the *Commonwealth Foundation* has responded to CHOGM mandates. Following discussions at the Commonwealth People's Forum in Malta 2005, it is examining the role of professional bodies and civil society in addressing climate change concerns. In October 2006 it organised a workshop on *"Adaptive strategies for climate change and disaster management in the Commonwealth"* which brought together Commonwealth Civil Society Organisations (CSOs) and professional bodies working in relevant sectors to identify effective practical strategies that can be implemented by civil society at the grassroots level in order to prepare for adaptation to climate change.

176. A wide range of civil society organisations and selected international organisations were invited to demonstrate what role they might play in meeting the challenges of adaptation for climate change and disaster management. The responses received were analysed, and over 30 organisations were then invited to attend the conference and to present their views. The conference formulated proposals for action by CSOs under the following themes:

- Health and the environment;
- Education, awareness and the role of the media;
- The built and urban environment; and
- Agriculture, forestry and fisheries.

177. Discussions have also been held with groups such as the Commonwealth Parliamentary Association (CPA), the Commonwealth Forestry Association and the Commonwealth Meteorological Conference, all of which have been working on climate change concerns.

178. The programme outlined below remains a living document that will be elaborated in the coming months and through the decision processes of constituent organisations. Its elements are presented here for discussion and planning purposes and remain flexible. It represents a unique initiative which seeks to galvanise the Commonwealth's networks to deliver timely and cost-effective support to its most vulnerable member states.

A COMMONWEALTH ROLE ON ADAPTATION TO CLIMATE CHANGE

Introduction

179. The actions outlined below are the outcome of continuing consultations amongst a wide range of Commonwealth institutions which are pursuing concerns of their members related to climate change, within the mandates and processes of their respective institutions. The result is a broad-based Commonwealth-wide platform of work supporting capacity building and technical assistance to communities, professional groups and governments, in their efforts to adapt to climate change. Implementation of these activities is the concern of individual institutions, sometimes working independently, but often working in close consultation or partnership with others.

180. The strength of the Commonwealth's approach in this area is that it can galvanise a wide range of networks that provide a strong asset base for implementing work on adaptation to climate change. They include the intergovernmental network (represented by the Commonwealth Secretariat), many professional and civil society organisations (represented through the Commonwealth Foundation), local government (represented by the Commonwealth Local Government Forum), and business (represented by the Commonwealth Business Council). At the intergovernmental level, the programme of work seeks to ensure that member states that face the most severe capacity limitations and the greatest vulnerability to climate change are supported in their efforts to protect their communities from the harshest impacts of climate change. At a professional level, the programme seeks to build skills to address this emerging field and to deliver that professional advice and support to both communities and governments alike. Finally, the programme is placing the needs of communities and vulnerable groups at the heart of its consultations and processes.

181. Commonwealth institutions will seek to work in close partnership with their constituencies to build partnerships and ensure that they are addressing critical needs and filling gaps. In this respect the activities presented here have been based on a series of consultations and desk-based study of current needs and frameworks of assistance.

[The following activities are currently being considered and developed. They remain exploratory at this stage]

1. <u>Commonwealth Secretariat</u>

182. The Commonwealth Secretariat is mainstreaming climate change activities in its next 4-year strategic plan for 2008/2012, drawing on its strengths in:

- *Technical co-operation* – through the Commonwealth Fund for Technical Co-operation (CFTC) which provides technical assistance, and focuses on building the capacity of people and institutions. Close partnership with member governments affords them full ownership of the implementation and outcomes;

- *Policy Development* – supporting networking and the exchange of best practices, based on similar political, legal, administrative and education systems; and

- *Consensus Building* – based on the fundamental characteristics of the association which include an equal voice for all members that enables the Commonwealth to act as a trusted partner.

183. The Commonwealth Secretariat is also elaborating a response to the Malta CHOGM request for "the Secretary-General to develop a mechanism for establishing and operationalising a Commonwealth Programme for Natural Disaster Management through which member countries can co-operate in capacity building for disaster risk reduction and disaster response management". Work on adaptation to climate change and disaster risk reduction will be closely co-ordinated.

a) Institution Building: Strengthening Capacities in Understanding the Risks

184. There is a range of world class expertise in the Commonwealth in climate modelling, scenario building and risk mapping, and we have seen that this remains a critical capacity gap within highly vulnerable member states. National Met Services and institutions such as the UK's Hadley Centre and Tyndall Centre, the Global Environmental and Climate Change Centre in Canada, and Australia's CSIRO are key resources on climate modelling.

185. The Commonwealth Secretariat recognises that there a number of on-going initiatives to build capacity in modelling and scenario-building which involve Commonwealth institutions, both on a bilateral basis and through the Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change. However, this is an area of considerable interest to vulnerable member states where the Commonwealth could add value. The Commonwealth Fund for Technical Co-operation has a strong track-record in institution building, working closely with regional training and policy bodies to address priority areas identified by client countries. CFTC liaise closely in the coming months with key institutions and member states to explore the role it can play to build capacity in-country and support of the Nairobi Work Programme.

186. The Commonwealth Service Abroad Programme may also have an important role to play, drawing on experiences of recently retired professionals to deliver capacity building in national institutions on modelling, scenario building and the integration of these tools into decision making processes.

b) Public Awareness and Engagement of Stakeholders

187. There is still a great deal of awareness-raising to be done about the impacts of climate change and likely risks, in support of Article 6 of the UNFCCC. The Commonwealth Secretariat will focus its work on facilitating awareness raising and the engagement of marginalised and vulnerable groups.

iv) Youth Engagement

188. The **Commonwealth Youth Programme (CYP)** is an international development agency that is dedicated to empowering young people (aged 15-29) in member countries. The CYP has a strongly decentralised governance structure and its Regional Youth caucus and National Youth Councils ensure a bottom-up approach. This means that the issues the CYP targets are based on young people's views, experiences and needs.

189. Climate change has significant implications for the livelihoods and wellbeing of future generations and the views of young people are critical in building adaptation strategies that address their needs and concerns. With this in mind, action points included in the forthcoming Commonwealth Plan of Action for Youth Empowerment are, to:

- Engage young people in awareness raising on climate change and other pressing environmental issues;
- Tap the knowledge base of young people and their grassroots organisations as part of environmental monitoring and scientific data gathering;
- Engage young people in technology transfer and uptake issues, including for example youth participation in "citizens' juries";
- Train young people in natural disaster preparedness and relief;
- Stimulate ethical consumerism among young people as an entry point to environmental awareness; and
- Mainstream environmental education and debate as part of school curricula.

190. The Commonwealth Youth Programme will also:

- Explore the concerns of young people on adaptation to climate change through its regional centres in Africa, Asia, the Caribbean and Pacific, and the Youth Caucus, bringing these to the attention of Commonwealth Youth Ministers; and

- Review and update the CYP's flagship Diploma in Youth Development Work, to integrate disaster risk reduction and climate change concerns into relevant sections. The Diploma is delivered in 45 countries by 27 Universities and training agencies across the Commonwealth.

v) The Role of Parliamentarians

191. With its focus on inter-governmental policy concerns, the Commonwealth Secretariat is well placed to work with the **Commonwealth Parliamentary Association**, to strengthen the capacity of parliamentarians to play a leadership role in preparing their constituencies for climate change. This Association brings together parliamentarians from across the Commonwealth to examine and develop approaches on a range of issues (see below).

192. Parliamentarians can ensure the climate change is mainstreamed across all areas of government, through their work in committees, by voting budgetary resources to support analysis and policy work, and by strengthening co-ordinating mechanisms at the national level to ensure that climate change is an integral part of national development planning and public and private sector strategies. Parliamentarians are well placed to ensure their administrations are run efficiently too, minimising CO_2 emissions and costs along the way. Finally, parliamentarians are strategically positioned at the centre of a web of stakeholder networks and have a critical role to play in disseminating information to build political will. As law makers, Commonwealth parliamentarians will be able to use the knowledge they gain to strengthen support for adaptation to climate change within their administrations.

vi) The Commonwealth Secretariat's Own Stakeholders

193. The Commonwealth Secretariat has a number of opportunities to raise awareness and promote action amongst its own stakeholders. This includes a commitment to mainstreaming climate change in advisory work within climate-sensitive sectors such as tourism and agro-processing. This builds on an on-going commitment to address concerns related to environmentally sustainable development in policy programmes, technical assistance and capacity building. Other important areas are the Commonwealth Secretariat's communications strategy and continuing efforts to address the ecological impacts of day-to-day operations.

194. The Commonwealth Consultative Group on Environment (CCGE) will have a role to play in airing concerns of member states and building consensus on future action. Climate change will be an important factor in a range of issues before the CCGE in coming years, including the UN Commission on Sustainable Development's policy cycle in 2008/2009 which addresses agriculture, rural development, land, drought and desertification. There are also opportunities for the Commonwealth Consultative Group on Human Settlements (CCGHS) to examine issues related to the planning and development of settlements in the context of disaster risk reduction and adaptation to climate change.

vii) *Other areas* that may be pursued through specific interventions in future include gender and health concerns.

c) Curriculum Development and Exchange

195. Consultations by the Commonwealth Foundation with Professional Associations have highlighted a need for curriculum development to integrate vulnerability risk assessment and climate change adaptation in professional qualifications and on-going training programmes of specialists working in areas such as development planning, the built environment, health, management of natural resources, agriculture/husbandry, education and the media. This is another area where the Commonwealth Secretariat has a strong track record, establishing masters degree programmes, supporting curriculum development and building skills in public administration. In support of initiatives by others in this area, the Commonwealth Secretariat will:

- Explore the potential for exchange of curricula and best practices between key training institutions in vulnerable member states, focusing on the continuum of disaster risk management and adaptation to climate change, and with a view to strengthening professional skills across a range of sectors from public administration to planning and resource management. Tertiary institutions in the Pacific, Mediterranean and Caribbean have materials which could be shared to their mutual benefit. The Secretariat will engage with the **Commonwealth of Learning**'s Virtual University for Small States and the University Consortium of Small Island States (UCSIS) and the **Association of Commonwealth Universities** on this matter.

- Closely related to this, the Commonwealth Secretariat will support consensus building and advocacy through the Commonwealth Consultative Group on Human Settlements for the **Commonwealth Association of Planners** initiative to elaborate new skills in planning that address development risks and opportunities (see CCGHS above, and ComHabitat below).

d) Advocacy and Policy Networking

196. The Commonwealth Secretariat recognises that climate change mitigation is critical if adaptation is to be manageable for LDCs and small states. Because of their capacity constraints, these member states find it particularly difficult to participate effectively in negotiations. As in other areas like trade, the Commonwealth Secretariat can assist this group with basic information sharing and support to help ensure they do not become marginalised in discussions around the post-2012 climate regime.

- Climate Hot Topics briefing service for vulnerable member small states;
- Regional and/or pre-negotiation workshops to exchange experiences and prepare for discussions (implemented in collaboration with other institutions active in this area);
- Advocacy work related to the concerns of vulnerable member states, implemented through the Commonwealth Secretariat policy development Divisions, and meetings of Youth, Education, Women's Affairs, Law, Human Settlements and Environment Ministers, as appropriate;
- Policy and advocacy work related to specific areas such as the examination by SBSTA-28 of implementation of the Nairobi Work Programme.

197. Because member states share similar legislative and legal systems, the Commonwealth Secretariat is also well placed to facilitate networking and the review of national legislative frameworks to help ensure that these are up to date and comprehensive in their approach to sustainable development. The Commonwealth Secretariat is currently working with member states to examine legislative frameworks on environmental protection. As we have seen, this is a fundamental prerequisite to adaptation to climate change. It will also explore, through its work on human settlements, the potential for a similar programme examining legislative frameworks to support disaster risk reduction and adaptation to climate change (see *ComHabitat* below).

d) Technical Assistance

198. Technical assistance provided through the Commonwealth Fund for Technical Co-operation builds on existing capacities and takes national/regional priorities as their starting point. The advantage of the Commonwealth is that it can facilitate South-South co-operation and the exchange *across different regions* of information, best practice and mutual support in implementing adaptation strategies.

199. The Commonwealth Secretariat will work closely with regional institutions and national CFTC Points of Contact to explore strategic technical assistance interventions on adaptation to climate change that can be met through CFTC to support implementation of climate adaptation strategies:

- Consideration will be given to the placement of CFTC Advisers in key institutions in small states regions, to help to network small states regions, support highly necessary regional platforms for adaptation; and increase support to national-level implementation, including in their preparation of applications to funding institutions.
- Networking and exchange of experiences in mitigation and adaptation to climate change across key sectors highlighted in the needs assessment.

2. Commonwealth Foundation

200. The Commonwealth Foundation is facilitating consultations amongst Commonwealth Associations in response to a call from participants at the Commonwealth People's Forum in Malta, November 2005.

201. The significance of civil society organizations is that they represent the voice of local communities across the Commonwealth. They are therefore able to identify and implement practical measures from the grassroots level, and thus complement national strategies of respective governments and other regional and international agencies by approaching the problem of adaptation to climate change and disaster management from a "bottom-up" perspective.

202. A recent consultation called *Preparing for Change: Adaptive Strategies for Climate Change and Disaster Management in the Commonwealth* brought together Commonwealth civil society organisations to identify effective practical strategies that can be implemented by civil society at the grassroots level in order to prepare for climate change and related disasters.

203. The Commonwealth Associations represent a worldwide network of expertise and technical skills in subjects as wide-ranging as nursing, engineering, forestry and local government. The conference demonstrated that each and every association has something to say about how the Commonwealth could and should prepare for the impacts of climate change by taking measures to adapt, and by preparing for unforeseen events, including disasters. Whilst the actions of individual associations will be of value in local communities and on the ground in small states and islands in particular, a joint programme of shared intelligence, advice and technological support will be invaluable as a resource to countries and communities worldwide. Commonwealth Associations examined actions that could be taken in the following areas:

- Information and awareness-raising;
- Education;
- Action in communities; and
- Action by professional networks.

204. Their proposals (outlined further as an annex to this paper) will be further considered and refined at a second international workshop on community-based adaptation to climate change, Dhaka, early in 2007.

3. Commonwealth Parliamentary Association

205. The Executive Committee of the Commonwealth Parliamentary Association, at its meeting in May 2006, agreed to the establishment of a Study Group on Parliamentarians and The Environment, which will be the first time that the CPA has focused specifically on environmental concerns. This initiative has arisen from the interest of CPA members who have recognised the critical importance of the environment as a global issue today. The Study Group will be hosted by the CPA's Belize Branch and is scheduled to take place in the first Quarter of 2007. This will be of a similar style to other Study Groups, which have often been a springboard to further more sustained CPA activities, and have helped to develop the capacities of parliamentarians to take a leadership role in key issues of concern.

206. The CPA Annual Conference in Abuja in September 2006 included discussions by Small States members on climate change, and a workshop on climate change and desertification. Delegates expressed their deep concern on behalf of the member states affected by the impact of climate change and desertification and their desire for members of the Commonwealth Parliamentarian Association to energetically pursue policy change and commitment from major world powers which will lead to a reduction in the effects of climate change. The conference also welcomed the opportunity to explore these matters in greater depth at the planned CPA Study Group, together with concerns related to unsustainable, and in some cases illegal logging.

4. ComHabitat

207. ComHabitat is Commonwealth partnership supporting implementation of the Habitat Agenda and a Commonwealth goal to "demonstrate progress towards adequate shelter for all with secure tenure and access to essential services in every community by 2015". The partnership has the potential to operate at range of governance levels, and to bring these levels together to develop multistakeholder approaches to ensure effective implementation of policy. The partnership is comprised of the Ministerial-level Commonwealth Consultative Group on Human Settlements (CCGHS) and agencies from government, local government, civil society and the private sector working to improve human settlements in Commonwealth countries. Currently, the key partners are the Commonwealth Secretariat, the Commonwealth Foundation, the Commonwealth Association of Planners, Commonwealth Human Ecology Council, Commonwealth Local Government Forum, Homeless International, and the UK Government's Department for International Development. ComHabitat can support research and focuses on networking and sharing practical examples of progress in implementation. Homeless International currently provides the secretariat function of ComHabitat.

208. People are being drawn to cities at a breathtaking pace. In the last 50 years, the percentage of the world's urban population has increased from 30 per cent to nearly 50 per cent. ComHabitat is in the process of developing a new strategic plan and in this it is considering work related to disaster risk reduction and adaptation to climate change in urban contexts. Suggested areas of focus are as follows:

- Recent discussions facilitated by the Commonwealth Foundation in Seychelles, highlighted a critical need to review, and in some cases to establish, basic planning frameworks, legislation, building standards and mechanisms for community involvement in decision making, to support adaptation to climate change and disaster risk management. ComHabitat will explore the potential of a programme to support the review of planning guidelines and legislative frameworks by governments (through the **Commonwealth Secretariat**); local government (through the **Commonwealth Local Government Forum**) and by professional groups (facilitated through the **Commonwealth Foundation**).

- advocacy for implementation of the **Commonwealth Association of Planners** `New Urban Planning' initiative, which seeks to transform capacities for governance of human settlements by strengthening skills that underpin a new proactive approach to urban development. The potential exists to use ICT networks, Commonwealth universities and other training institutions, professional groups and practitioners to develop curricula, learning materials and share experiences in sustainable planning of urban centres.

5. Commonwealth Meteorologists Conference

209. Meteorologists are a critical group of professionals involved in the collection of climate data and its application to decision making. Commonwealth Meteorologists Conference, at their most recent conference held in the UK in June 2005, produced a strong statement on the role of National Meteorological and Hydrological Services (NMHSs) in forecasting and alerting citizens to hydro-meteorological events that impact on the safety of life, property and livelihood. For Met Services themselves, there are concerns around institutional arrangements and capacities, if they are to play an effective role in disaster risk management systems, and in sectors such as health, agriculture and tourism which have significant weather information needs. Their success depends not only on strategic partners like local media and academia, but also on the network of other NMHSs. Commonwealth Meteorologists meet every four years, and the Executive Committee meets regularly in the wings of sessions of the World Meteorological Organisation to take forward work in the interim period. Members of the Commonwealth Meteorologists will continue to advocate concerns around the impacts of climate change and explore concrete opportunities to develop their services and skills to meet the challenge of adaptation to climate change.

6. Commonwealth Forestry Association

210. The Commonwealth Forestry Conference held in Sri Lanka in March 2005 emphasised the readiness of Commonwealth foresters to take practical action on disaster risk management and mitigation, poverty reduction and enabling the poorest in society to adapt to socio-economic, environment and climate change. The Commonwealth Forestry Association (CFA) is working with its partners to integrate climate change into the mainstream objectives and work programmes of Forest Departments and forestry-related CSOs throughout the Commonwealth.

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Annex Recommendations by Commonwealth CSOs and others for action on adaptation to climate change and disaster management in the Commonwealth

The following are the principal areas of recommendations for follow-up arising from the Commonwealth Foundation/Government of the Seychelles conference `Preparing for Change: Adaptive Strategies for Climate Change and Disaster Management in the Commonwealth' (9-12 October 2006, Seychelles). Further work is being undertaken to develop these and other ideas into firm proposals in time for inclusion in a comprehensive Commonwealth programme of work for submission to Commonwealth Heads of Governments at their meeting in Kampala, November 2007.

a) Information and Awareness Raising

- Facilitating the ***dissemination of existing information and resources*** for the benefit of the Commonwealth Associations [Potential lead: Commonwealth Foundation];

- Enhancing the ability of ***journalists, broadcasters and other members of the media*** to explain climate change issues and associated disasters. Also, enhancing the ability of Commonwealth organisations to work effectively with the media in this sector. Initiatives could include training of journalists, and guidance for Commonwealth organisations in developing their ability to work effectively with the media. [Potential leads: Commonwealth Press Union (CPU); Commonwealth Broadcasting Association (CBA); Commonwealth Journalists' Association (CJA)].

b) Education

- ***Integrating adaptation to climate change and disaster management into both formal and informal education***. Initiatives could include; resource packs for teachers in accessible formats, drawing on existing materials. In less formal situations, some form of certification system is needed to recognise student participation in training in adaptation and disaster management. [Potential leads: Commonwealth Association of Science, Technology and Mathematics Educators (CASTME); Commonwealth of Learning (CoL), Council for Education in the Commonwealth (CEC); Association of Commonwealth Universities (ACU); Commonwealth Geographical Bureau].

- ***Exchanging students for higher education in environmental protection***. Environmental education is a priority area and opportunities are needed for Commonwealth scholarships in environmental sciences and other relevant areas at degree and postgraduate levels. [Potential leads: Association of Commonwealth Universities (ACU); Commonwealth Scholarships Commission].

c) Action in Communities

- ***Empowering local governments and communities*** is a necessary part of climate change adaptation and disaster management. One way is to seek out and promote examples of best practice around the Commonwealth [Potential leads: Commonwealth Local Government Forum (CLGF); Commonwealth Association for Public Administration and Management; Commonwealth Parliamentary Association].

d) Action by Professional Networks

- ***Promoting multi-hazard vulnerability analyses, maps and plans***, taking into account adaptation needs and pre-and post-disaster management requirements, and engaging appropriate expertise from across the Commonwealth's professional associations. [Potential leads: Commonwealth Secretariat, Commonwealth Local Government Forum (CLGF), Commonwealth Association of Architects (CAA), Commonwealth Association of Planners (CAP) and Commonwealth Association of Surveying and Land Economy (CASLE).]

- Reviewing, developing and disseminating information on appropriate ***regulations, codes and legislation*** needed in the face of climate change and the need for adaptation and disaster management. Professional bodies can advise on appropriate forms of regulation, codes and legislation to meet the need to reduce vulnerability. [Potential leads: The Commonwealth Secretariat, CLGF, Commonwealth Association of Architects (CAA), Commonwealth Association of Planners (CAP) and Commonwealth Association of Surveying and Land Economy (CASLE).]

- ***Preparing handbooks on sustainable redevelopment and resettlement***, drawing on lessons learned and outlining processes for decision making rather than set solutions. This information is readily available from many international organisations and should not be onerous to compile. [Potential lead: Commonwealth Association of Architects].

- Supporting appropriate national and international ***forest governance initiatives***. Deforestation, acknowledged as a major source of atmospheric carbon and cause of climate change, is exacerbated by poor governance. A range of activities to support good governance, promote reforestation and encourage climate control as a key objective of forest management is required. Further consultation amongst the forestry community, and perhaps in associated industries, is needed in order to identify clear objectives. [Potential lead: Commonwealth Forestry Association].

- ***Mainstreaming climate change adaptation measures and disaster management into the programmes of professional associations across the Commonwealth***. Actions include: collaborative programmes; use of Association's own periodic newsletters/journals; and training programmes on adaptation to climate change and disaster management, tailored to the various professional specialities, will also become a possibility. [Potential leads: Commonwealth Foundation in cooperation with all Commonwealth Associations].

List of Acronyms

ACCC	Adaptation to Climate and Coastal Change in West Africa
ADB	Asian Development Bank
AEZ	Agricultural Ecological Zone
AfDB	African Development Bank
AIACC	Assessments of Impacts and Adaptation to Climate Change
AIMS	Atlantic, Indian Ocean, Mediterranean and South China Seas
AMMA	African Monsoon Multidisciplinary Analysis
AOC-HYCOS	Hydrological Cycle Observing System
AOSIS	Alliance of Small Island States
APF	Adaptive Policy Framework
BMZ	German Federal Ministry for Economic Cooperation and Development
CARICOM	Caribbean Community
CBA	Community-based Adaptation Programme
CCAA	Climate Change Adaptation Support Programme for Action-Research and Capacity Development in Africa
CCAP	Climate Change Action Plans
CCCCC	Caribbean Community Climate Change Centre
CCCDF	Canada Climate Change Development Fund
CCGE	Commonwealth Consultative Group on Environment
CCGHS	Commonwealth Consultative Group on Human Settlements
CERES	Crop Environment Resource Synthesis
CFA	Commonwealth Forestry Association
CFTC	Commonwealth Fund for Technical Co-operation
CGIAR	Consultative Group on International Agricultural Research
CHOGM	Commonwealth Heads of Government Meeting
CIDA	Canadian International Development Agency
COP	Conference of the Parties (to UNFCCC)
COP/MOP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CPA	Commonwealth Parliamentary Association
CPACC	Caribbean Planning for Adaptation to Climate Change
CSAG-UCT	Climate System Analysis Group of the University of Cape Town
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
CSOs	Civil Society Organisations
CYP	Commonwealth Youth Programme
DAC	Development Assistance Committee (OECD)
DEFRA	UK Department for Environment, Food and Rural Affairs
DFID	UK Department for International Development
DGIS	Directorate-General for International Cooperation
DiMP	Disaster Mitigation for Sustainable Livelihoods Programme of the University of Cape Town
EC	European Community
ECA	UN Economic Commission for Africa
ENDA	Environmental Development Action in the Third World
ENSO	El Niño Southern Oscillation
FAO	UN Food and Agriculture Organisation
GDP	Gross Domestic Product
GEF	Global Environment Facility
GTZ	German Technical Cooperation
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
IADB	Inter-American Development Bank
IDRC	International Development Research Council
IOC	Indian Ocean Commission

IPCC	Inter-governmental Panel on Climate Change
ISDR	International Strategy for Disaster Reduction
LCA	Linking Climate Adaptation Network
LDCF	Least Developed Countries Fund
LDCs	Least Developed Countries
MACC	Mainstreaming Adaptation to Climate Change
MANDISA	Monitoring, Mapping and Analysis of Disaster Incidents in South Africa
MARA	Mapping Malaria Risk in Africa
MDGs	Millennium Development Goals
NAPAs	National Adaptation Programmes of Action
NC	National Communications
NCSP	National Communication Support Programme
NEPAD	The New Partnership for Africa's Development
NGO	Non Governmental Organisations
NMHSs	National Meteorological and Hydrological Services
NOAA	US National Oceanic and Atmospheric Administration
NORAD	North American Aerospace Defence Command
OECD	Organisation for Economic Co-operation and Development
PACC	Pacific Islands Adaptation to Climate Change Project
PACCLIM	Pacific Climate Impacts Model
PICCAP	Pacific Islands Climate Change Adaptation Programme
PRSPs	Poverty Reduction Strategy Papers
RING	Regional and International Networking Group
SAARC	South Asian Association for Regional Cooperation
SADC	Southern African Development Community
SADC-HYCOS	Hydrological Cycle Observing System
SCCF	The Special Climate Change Fund
SEI-Oxford	Stockholm Environment Institute - Oxford Office
SEA-START	Southeast Asia START Regional Center
TEA-START	Temperate East Asia START Regional Center
SIDS	Small Island Developing States
SNC	Second National Communication
SPA	Strategic Priority on Adaptation
SPACC	Special Program on Adaptation to Climate Change
SPREP	South Pacific Regional Environment Programme
START	System for Analysis, Research and Training
TWAS	Third World Academy of Sciences
UCSIS	University Consortium of Small Island States
UN	United Nations
UNCCD	UN Convention on Combating Desertification
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNITAR	United Nations Institute for Training and Research
VA	Vulnerability Assessment
VARG	Vulnerability and Adaptation Resource Group
WEDO	Women's Environment and Development Organisation
WHO	World Health Organisation
WHYCOS	World Hydrological Cycle Observing System
WMO	World Meteorological Organisation