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Subsidiary Body for Scientific and Technological Advice
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Item 3 of the provisional agenda
Nairobi work programme on impacts, vulnerability and adaptation to climate change

Views on potential future areas of work of the Nairobi work programme on impacts, vulnerability and adaptation to climate change

Submissions from Parties and relevant organizations

1. The Conference of the Parties (COP), at its sixteenth session, requested the Subsidiary Body for Scientific and Technological Advice (SBSTA) to reconsider, at its thirty-eighth session, the work areas of the Nairobi work programme on impacts, vulnerability and adaptation to climate change with a view to making recommendations to the COP at its nineteenth session on how to best support the objectives of the Nairobi work programme; this process would further inform the organization of potential future areas of work that could also support the scientific and technical work under the Cancun Adaptation Framework, as appropriate.[1]

2. The COP, at its sixteenth session, also requested Parties and relevant organizations to submit to the secretariat, by 17 September 2012, their views on potential future areas of work of the Nairobi work programme.[2] The COP further requested the secretariat to compile those submissions into a miscellaneous document for consideration by the SBSTA at its thirty-eighth session in order to inform the process mentioned in paragraph 1 above.[3]

3. The secretariat has received 38 such submissions. In accordance with the procedure for miscellaneous documents, the 11 submissions from Parties,[4] the four submissions from United Nations organizations[5] and the one submission from an intergovernmental

[1] Decision 6/CP.17, paragraph 1.
[2] Decision 6/CP.17, paragraph 2.
[3] Decision 6/CP.17, paragraph 3.
[4] Also available at <http://unfccc.int/5901.php>.
[5] Also available at <http://unfccc.int/3714.php>.

organization[6] are attached and reproduced* in the languages in which they were received and without formal editing. In line with established practice, the 22 submissions from non-governmental organizations have been posted on the UNFCCC website.[7]

[6] Also available at <http://unfccc.int/3714.php>.

* These submissions have been electronically imported in order to make them available on electronic systems, including the World Wide Web. The secretariat has made every effort to ensure the correct reproduction of the texts as submitted.

[7] <http://unfccc.int/3689.php>.

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* This submission is supported by Bosnia and Herzegovina, Croatia, Iceland, Serbia and the former Yugoslav Republic of Macedonia.

Paper no. 1: Australia

Submission under decision 6/CP.17 | October 2012

Nairobi work programme on impacts, vulnerability and adaptation to climate change | SBSTA

I. Overview

This submission contains the views of the Australian Government on potential future areas of work for the Nairobi work programme on impacts, vulnerability and adaptation (NWP), as requested under paragraph 2 of decision 6/CP.17.

Climate change impacts including higher temperatures, sea level rise, extreme weather events and the spread of infectious diseases have human health consequences. The IPCC found that climate change is already contributing to disease and premature death around the world, and that these effects are increasing. Those living in developing countries, particularly Least Developed Countries (LDCs) and Small Island Developing States (SIDS) are disproportionately vulnerable to health problems associated with climate change.

Australia maintains that further work is required to understand the physical and psychological impacts of climate change on individual and community health. In particular, further work could draw on the experience of health sector workers, as a useful resource in understanding and addressing the climate change impacts on health.

This submission therefore recommends further consideration of health and climate change in the NWP. This is in line with the NWP's two key objectives of assisting countries covered by the NWP to improve their understanding and assessment of impacts, vulnerability and adaptation to climate change, and to help them make informed decisions on practical adaptation actions and measures.

II. Climate change physical effects

A wide-ranging study of the effects of health and climate change by the Climate Commission,[1] an independent body of cross-sector Australian experts, finds that health risks rise dramatically with increasing temperatures.

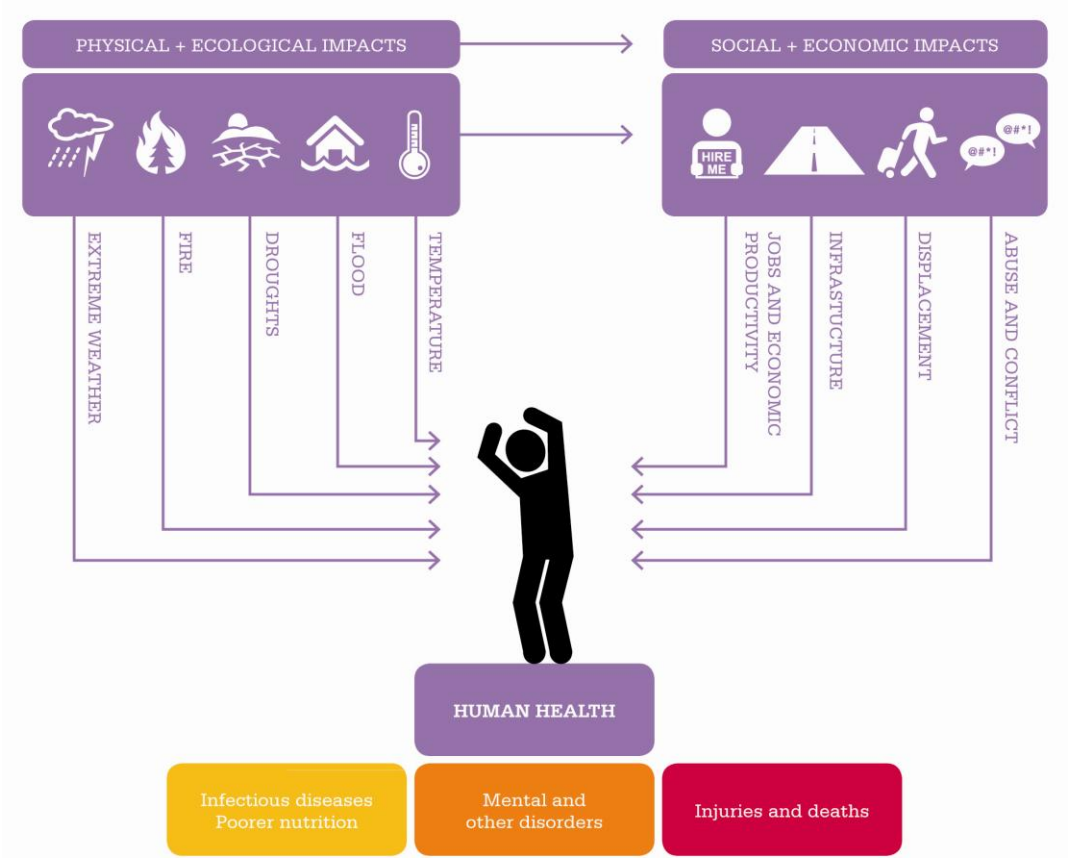
Even small changes in our environment can have dramatic effects on the human body. Serious heat stroke and even death can occur after a relatively short time if a person's core body temperature exceeds 42 degrees Celsius. A three-day heatwave at around 43 degrees Celsius in the city of Melbourne in 2009 led to 980 deaths, an estimated 62 percent increase above normal fatality levels. Rising temperatures threaten the health of everybody, while those least able to respond will be the most at risk. These include people with existing illnesses such as kidney and heart-related problems. Old people and children will also bear the brunt of climate change in LDCs.

[1] Climate Commission 2012, The Critical Decade: Climate change and health
http://climatecommission.gov.au/report/the-critical-decade-climate-change-and-health/

Climate change affects our health and wellbeing in many ways, through both direct and physical impacts and flow-on social and economic changes (see Figure 1 below). For example, rising temperatures and increasing heatwaves can affect the availability and affordability of foods that contribute to a healthy diet. For example, a severe heatwave in Western Europe in 2003 reduced grain yields by 25 percent in much of France.

Poor rural populations in developing countries reliant on subsistence farming are particularly vulnerable to climate change, as the growth, physical and mental development and, at the extreme, the survival of children are threatened by food shortages. [2] Rising food prices will affect the most socially disadvantaged populations, while financial pressures increase the likelihood of shifts to food with the lowest price per calorie. This can lead to an increased reliance on imported and processed foods, with a resultant rise in obesity and related non-communicable diseases such as hypertension, diabetes and stroke – a problem particularly prevalent in Pacific SIDS.

Figure 1: The many ways that climate change can affect health



[2] World Health Organization 2009, Protecting health from climate change: connecting science, policy and people
http://www.who.int/globalchange/publications/reports/9789241598880/en/index.html

Climate change is likely to lead to increases in certain types of air pollutants, as well as air-borne allergens like pollen and mould spores. These have serious impacts on people who suffer from respiratory illnesses, such as asthma and hay fever. Through alterations in temperature, rainfall and humidity, climate change is also beginning to increase the occurrence of various infectious diseases around the world – some mosquito-born, some water-borne and some food-borne.

Urban populations, especially those in tropical megacities (like our recent UNFCCC informal session host city, Bangkok), are highly vulnerable due to the large concentration of people and infrastructure. Urban areas are exposed to a combination of health risks such as heatwaves, floods, infectious diseases and air pollution, while the "urban heat island effect" means that the average annual air temperature of a city with a million people can be 1 to 3 degrees hotter than surrounding areas. A warmer and more variable climate threatens to increase disease transmission and slow or even reverse the global public health community's progress against infectious and heat-induced diseases. Ultimately, the greatest health impacts may stem from the gradual build-up of pressure on the natural, economic and social systems that sustain health, which are already under stress in much of the developing world.

III. Climate change psychological effects

Australia's Climate Commission report has found that rising temperatures are also linked to an increase in mental health problems. Recent reports show that hospital admissions for mental and behavioural disorders in both rural and urban areas of Australia rise once ambient temperatures go above approximately 27 degrees Celsius.

Extreme weather events—including floods, hailstorms, heatwaves, bushfires and dust storms—can have traumatic impacts on individuals and communities, in extreme cases even leading to forced resettlement. Even just the prospect of future climate change and its likely effects exacerbates the feelings of stress for people already living on the margins.

Rural communities that experience downturns or disruptions in production due to changes in climate and environment are widely expected to experience stress, and, for many, depression. A decade of recent experience with drought and reduced farm yields in the southern parts of Australia underscore the risks of community morale, livelihoods, and health. One study of Australia's most populous state (New South Wales) found that a decrease in annual rainfall by 300mm leads to an increase in the suicide rate by about 8% over the long-term average suicide rate.

IV. Linking the health sector with climate change adaptation

The effects of climate change on human health are already being felt around the world and are likely to grow worse with time. The risks of climate change can be minimised by adaptation: strengthening the foundations of good health and understanding the changes needed.

Australia maintains that doctors, nurses and emergency service providers can have insight into the ways climate change damages people's health. They deal directly with the victims of extreme weather events such as cyclones and heatwaves along with the unseasonal and increased spread of disease.

Health sector workers are ideally placed to assist domestic adaptation strategies that encourage the resilience of their nation's health infrastructure and wider society. For instance, their inputs on scoping the health-related aspects of adaptation activities such as water and disaster risk alleviation should be valued highly. They also have a central role to play in ensuring that national health care systems are prepared to deal with an increase of health problems caused by climate change.

The role of health professionals as trusted communicators and respected members of society are especially useful in explaining the effects of climate change to affected individuals and educating the general public. Surveys have shown that they are among those most trusted to provide credible information about climate change. Health sector workers' past effectiveness in raising public awareness and advocating appropriate solutions to public health concerns, such as tobacco smoking, provides a good example of how they could provide adaptation advice to individuals and wider groups.

Australia recommends that the NWP consider further work on health and climate change, including engaging with health sector workers as a useful resource both to raise awareness and to address climate impacts in this area.

Paper no. 2: Chile

As specified in Decision 6/CP.17 of SBSTA, in which Parties and relevant organizations are invited to submit to the Secretariat, by 17 September 2012, their views on potential future areas of work of the Nairobi Work Programme, the Government of Chile proposes to establish an area of work on "Mountains and Climate Change" in light of the special attention needed by mountain ecosystems to adapt to the effects of climate change. In this connection, we would be particularly interested in collecting, analyzing and disseminating information on past and current practical adaptation through communication and collaboration at the national and international level. We are of the view that mountains provide vital goods and services to more than half of the world's population but they are fragile ecosystems that require specific protection and management.

Paper no. 3: Costa Rica

SUBMISSION BY COSTA RICA – CENTRAL AMÉRICA

Nairobi Work Programme (NWP) on impacts, vulnerability and adaptation to climate change

Mandate

As specified in the decision 6/CP.17 of SBSTA in which Parties and relevant organizations are invited to submit to the secretariat, by 17 september 2012, their views on potential future areas of work of the Nairobi Work Programme.

The G**overnment of Costa Rica**, on behalf of the **Ministry of Environment, Energy and Telecommunications** propose the establishment of a working area on **"Mountains ecosystems assessment as a contribution to climate change"** given the importance of these ecosystems due to of its vulnerability for the constant threats, impacts have already been observed through the research that has been done and that is supposed to be due to climate change. Not only as consequence melting glaciers, it is necessary to know how feasible is the approximate time remaining to exploit the potential of water, so that people make their forecasts, find another options mining operation where there are not glaciers, you need to know which species are without studying flora and fauna, suggesting possible management options and monitoring of the resources.

Some of the countries known as the most vulnerable, do not know all the potential that exists into the mountains, specially at the tropical countries and therefore it is necessary to research; also be necessary to include the themes for gender sensitive tools and working with indigenous communities to rescue knowledge, as well as the production of material to extend the knowledge of research in appropriate language, in addition to providing languages other than English.

This submission relate with research, protection and conservation of our forests is a national commitment, in Government policies to protect the mountains is a compromise in which the Ministry of Environment, has an infrastructure, to protect and conserve, but not have all the resources to improve our knowledge. This situation must be very similar to that of the other countries considered vulnerable to climate change.

The mountains are important from several points of view, **social**, as people continued living there, **food security**, and **economic**, because it generates funds to some people who work with tourism, all these activities must be focused in order to become sustainable.

The investigation of the elements mentioned above and others more depending on the specific conditions of mountain ecosystems around the world, is within the areas of work the proposed NWP. This interest is also similar to other institutions working in the ecosystems like the Mountain Partnership.
Costa Rica wishes to propose the establishment of a work programme in the context of the Nairobi Work Program, at COP18, that incorporates the topics mentioned above.

Paper no. 4: Cyprus and the European Commission on behalf of the European Union and its member States

This submission is supported by Bosnia-Herzegovina, Croatia, Iceland, the Former Yugoslav Republic of Macedonia and Serbia.

Nicosia, 14 September 2012

Subject: Views on potential future areas of work of the Nairobi work programme

The EU welcomes the decision taken in Durban launching the process to reconsider, at the thirty-eighth session of SBSTA, the work areas of the Nairobi work programme with a view to making recommendations to the COP at its nineteenth session on how best to support the objectives of the Nairobi work programme.

Cyprus and the European Commission, on behalf of the EU and its 27 Member States, welcome this opportunity to share its views on this subject.

General comments

The EU welcomes the significant progress made in implementing activities under the Nairobi Work Programme on impacts, vulnerability and adaptation to climate change[1]. The EU notes that the NWP has developed into a broad platform for sharing of information and building knowledge on impacts, vulnerability and adaptation to climate change between practitioners, experts, relevant international and regional institutions and policymakers. The NWP also plays an important role in efforts to enhance capacity on adaptation issues among practitioners and covers a wide range of issues that are of interest to all countries.

The EU therefore believes that decision 2/CP.11 should continue as the basis for future activities underlining the catalytic role of the convention.

The EU also notes that additional efforts have been made to enhance the needs-orientation and the dissemination and relevance of information generated through the NWP.

However, some challenges remain on how to enhance the dissemination of information generated through the programme and deliver this to the relevant actors and stakeholders in order to enable informed decision making, for example in the least developed countries.

[1] FCCC/SBSTA/2012/INF.1

Specific suggestions

In order to further improve the Nairobi work programme the EU suggests to focus on efforts to enhance the catalytic role of the NWP in understanding how to improve the use of data, information and knowledge on vulnerability, impacts and adaptation by stakeholders at different levels In so doing, the NWP should aim to address this across existing thematic areas, and while allowing for exchange of experiences, lessons learned and identification of best practices to enhance the ongoing efforts to better inform decision making, planning and implementation of measures to assess vulnerabilities and impacts and enhance adaptative capacities. The EU also suggests considering in the context of work area adaptation planning and practices, lessons learned with regard to the integration of adaptation into relevant policy areas and coherence with sustainable development practices. Experiences and lessons learned from countries on what constitutes effective adaptation and how to monitor and evaluate the effectiveness of efforts undertaken could also be considered under this work area.

With regard to the work area climate related risks and extreme events the EU proposes including a focus on slow onset events such as sea level rise, melting of glaciers or degradation of ecosystems to better complement the extreme events already addressed under this work area.

The EU would also like to encourage the inclusion of gender perspective and participation of women in relevant activities under the NWP (e.g. workshops).

The EU sees great value in building on the work undertaken to date under the NWP to inform the ongoing work on the elements of the Cancún Adaptation Framework and notes the potential to draw on the activities of the Adaptation Committee and the Cancún Adaptation Framework in general, as appropriate, in further elaborating the NWP including priority setting.

It is of great importance to make best use and enhance the engagement of organizations and institutions outside of the UNFCCC, such as WMO, FAO, WHO, other Rio Conventions, UNISDR, UNEP, UNDP, and other relevant stakeholders etc. in the work under the NWP in order to strengthen the catalytic role of the Convention.

The EU looks forward to consider with other Parties the further development of the Nairobi work programme within its current mandate and taking into account the other ongoing work on adaptation under the Convention.

Paper no. 5: Gambia on behalf of the least developed countries

Least developed country Group submission on the Nairobi Work Programme on impacts, vulnerability and adaptation to climate change:

Proposals on upcoming activities under the NWP

1. Background

The LDCs welcome the opportunity to provide submissions on further possible activities under the Nairobi Work Program (NWP), according to the conclusion of the 34th session of the subsidiary body of Implementation (SBI). In alignment with the FCCC/SBSTA/2011/2, LDCs hereby submit the proposals of the group for upcoming activities under the Nairobi Work Programme (NWP).

The LDCs, as the most vulnerable countries to climate change acknowledge the importance of the NWP to provide support and input to better understand the issues related to impacts, vulnerability and impact of climate change. The group is supportive of the continuation of the Work Program and invites the SBTSA to agree on a **third phase of the program** to take over the current ongoing interim activities, with the aim to ensure the improvement of activities and to provide necessary and relevant knowledge generation to support understanding of the vulnerability and adaptation actions in developing countries, particularly in LDCs.

Recalling decision 1/CP.16 that affirms that enhanced action on adaptation should follow a country-driven, gender sensitive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional and indigenous knowledge, with a view to integrating adaptation into relevant social, economic and environmental policies and actions, where appropriate, the LDCs Group believes that Nairobi Work Programme in its future activities need to give special consideration to the specific situation of the Least Developed Countries in order to facilitate access to information which will very soon be needed by this Group for developing and implementing significantly important adaptation activities (*e.g.* LDCs' process (NAPs). The LDCs Group in this submission suggests different types of activity that could be undertaken in line with the areas of work suggested by Parties and included in Annex 1.

2. Further activities

Proposals on further activities are related to following issues regarding (1) dissemination of information, (2) capacity building under the program, (3) indigenous and traditional knowledge, (4) understanding of cost-effectiveness of adaptation, (5) gender, (6) cross-sectoral issues and (7) the length and content of the program.

2.1. Efficient dissemination of information and knowledge products under NWP

Because of the particular vulnerability of the LDCs Group NWP's information need to be (as possible) synthesised based on vulnerabilities, sectors, regions etc. and in addition to that and for the information to be user friendly and useful the Knowledge products must be translated to all the official UN languages. In each country, one person at national government level needs to be identified as a focal point for ensuring

dissemination of information (generated by previous and upcoming activities of NWP and other relevant programmes).

The NWP secretariat is invited to enhance the work regarding provision of knowledge products to be made available to Parties and adaptation planners and practitioners. The information should be provided via appropriate tools and in a form suitable for the purpose and the target group. It should include practical and user friendly publications, to be widely disseminated via different channels, highlighting step by step approaches, lessons learnt, best practices and challenges in implementing adaptation activities. It should be developed in the different areas and for the different sectors that have been identified to be most affected by climate change in developing countries, as those mentioned above.

Research and tool development and approaches under the Work Program must be designed to address the needs of the target group. LDCs invite partners to develop practical guidelines, tools and methodologies, examining among others processes for adaptation planning and its integration into development plans at all levels of the countries; approaches to consider and integrate cross cutting issues (e.g. gender). For this purpose, the LDCs invite the SBSTA and the NWP to consider the organization for a **stocktaking meeting** at the very beginning of the new phase, which will allow discussion of needs and how partners can effectively cooperate to address them.

The knowledge sharing practices under the NWP should be enhanced with a collaborative action with the actions undertaking under the Article 6 of the Convention. Furthermore, the list of countries to be invited to further workshops of the NWP should be broadened and efforts should be undertaken to invite different Parties on a rolling basis during the whole duration of the work program, to allow inclusiveness.

2.2. Need for specialised training (including training of trainers) in order to achieve capacity building.

Developing countries in general and LDCs in particular require a lot of support regarding modelling and scenarios. High resolution climate change scenarios are required for planning of adaptation actions. LDCs have limited abilities to develop adaptation scenarios and accordingly they require facilitation of access to climate modelling output. Capacities could be enhanced through efficient training programmes and through provision of access to relevant software during training session as well as provision of online access supported by technical support hotlines. LEG should be involved in discussions on how to bring together the most appropriate people to such events.

2.3. Enhancing the use of indigenous and traditional knowledge practices for adaptation

The LDCs call upon the NWP to promote the use of traditional knowledge by enhancing collaboration with organizations developing the use of such knowledge and to support knowledge sharing of these endigeneous and traditional knowledge and how it assists community in building resilient and adapt to climate change.

2.4. Enhance understanding of cost effectiveness of adaptation

There is need for information sharing on practical examples on cost effectiveness of adaptation related issues. Up to date very few studies were carried to address this issue, there is need for tools and methods in order to make it comprehended for integration in adaptation planning.

2.5. Application of gender –sensitive approaches

Up to date the issue of gender has been addressed in very shay manner, it need to be given satisfactory emphasis in order to make it visible. The latter could be achieved through consideration stocktaking of gender as cross cutting issue, identification of gender sensitive issues etc. reanalysis of relevant document and reports (NAPAs, TNAs, NCs etc.) could be targeted in NWP's workshop for synthesis of relevant gender information. Case studies consideration for recommendations of very specific areas for implementation of adaptation actions

2.6. Strengthening sector-specific and cross-sectoral activities to address impacts, vulnerability and adaptation issues relating to, inter alia:

(i). Water (including drought, floods and glacial melt);
(ii). Food security (including agriculture and subsistence livelihoods);
(iii). Ecosystems (including mountain ecosystems and coastal and marine ecosystems);
(iv). Infrastructure and human settlements.

These sectors are of utmost important for LDCs almost all of them were addressed in the LDCs NAPAs. The latter need to be addressed by the upcoming NWP activities/programmes analysis and synthesis of informations as well as challenges facing countries need to be targeted. Participation in the upcoming workshops/activities should be broaden to involve appropriate stockholders (*e.g.* representatives of related national institutions, NAPA implementers etc.)**.** The LDCs Expert Group (LEG) should be involved in discussions and consulted on how to bring together the most appropriate people to such events.

2.7. Length and size of programme

Length

LDCs Group suggest that the next phase of the NWP should be a further 5 years, to allow sufficient time for planning and implementing the wide variety of activities that Parties have included in Annex 1, with annual review through a report to the COP.

Size of programme

Even though all nine (9) areas are still relevant for the Work Program, enhanced action should be initiated in the areas related to "***Adaptation planning and practices"*** and "***Research and systematic observation***". Furthermore, the sectors that are the most vulnerable in developing countries should be given appropriate consideration, among which, Agriculture and food security, Water resources, Energy, Costal zones and ecosystems, as mentioned above.

Paper no. 6: Guinea

Conformément aux recommandations par décision 6/CP.17 à l'Organe subsidiaire de Conseil Scientifique et Technique (SBSTA) de la Convention-Cadre des Nations Unies sur les Changements Climatiques (CCNUCC), je viens par la présente, au nom de mon pays, la République de Guinée, soutenir très vivement la création d'une zone de travail sur « Montagnes et Changement Climatique » dans le Programme de travail de Nairobi de la CCNNUCC, compte tenu de l'attention particulière requise par les écosystèmes de montagne afin de s'adapter aux effets néfastes des changements climatiques.

En effet, les montagnes fournissent des biens vitaux et des services à plus de la moitié de la population mondiale, mais elles sont cependant des écosystèmes fragiles qui nécessitent une gestion et une protection spécifique. Ces écosystèmes sont particulièrement touchés par l'impact du changement climatique. Certains des indicateurs les plus évidents du changement climatique proviennent des régions montagneuses, comme le vaste recul des glaciers qui a été observé des pôles aux régions tropicales au cours des dernières décennies, le nombre croissant de catastrophes et les processus de désertification accélérée, pour n'en citer que quelques uns.

C'est pour dire que cette zone de travail permettra à mon pays qui est montagneux, d'améliorer la compréhension et l'évaluation des impacts, la vulnérabilité et l'adaptation pratiques visant à répondre aux changements climatiques sur les questions scientifiques, techniques et socio-économiques, tout en tenant compte de la variabilité et du changement climatique actuel et futur.

Paper no. 7: Kyrgyzstan

Views from Kyrgyzstan on potential future areas of work of the Nairobi work programme

As specified in the Decision 6/CP.17 of SBSTA, in which Parties and relevant organizations are invited to submit to the secretariat, by 17 September 2012, their views on potential future areas of work of the Nairobi work programme, on behalf of the Government of the State Agency on Environmental Protection and Forestry of the Kyrgyz it is proposed to establish an area of work on "mountains and climate change" in view of the special attention needed by mountain ecosystems to adapt to the effect of climate change. Mountains provide vital goods and services to more than half of the world's population but they are fragile ecosystems that require specific protection and management.

Paper no. 8: Nepal

SUBMISSION BY NEPAL

NWP on Impacts, Vulnerability and Adaptation to Climate Change (SBSTA)
View on Potential Future Areas of Work of the NWP

Recognizing the specific needs of countries having fragile ecosystems, including mountain ecosystems as per Article 4, paragraph 8 of the Convention, Nepal takes this opportunity to submit its views on potential future areas of work of the Nairobi Work Programme (NWP) as per paragraph 2 of decision 6/CP.17. In this regard, Nepal also recalls paragraphs 210–212 of *The Future We Want*, the outcome of Rio+20 Conference, that recognizes the importance of mountains and calls for greater efforts and international support for sustainable mountain development in developing countries.

Mountain ecosystems provide vital goods and essential ecosystem services. They play a crucial role in water, food and energy nexus as the world's 'water towers' and biodiversity hotspots. Mountain watersheds serve as the source of water to more than 50% of world's population and support the livelihoods and food security of billions of people.

Despite the significant role that the mountain ecosystems play and given their high fragility, the mountain agenda has not been addressed adequately in the international environmental agreements and negotiations including the UNFCCC COPs. The Prime Minister of Nepal, during COP-15 at Copenhagen, called upon all the mountain countries and stakeholders to come together to form a common platform to ensure due attention to mountain concerns associated with climate change in international deliberations.

As a follow up to this, the Government of Nepal launched the Mountain Initiative (MI) in 2010 in order to provide a framework within which mountain countries and international institutions working on mountain issues could collaborate for achieving greater recognition of the critical role of mountain ecosystems. The objectives of the MI are:

- Mobilizing meaningful support and ensuring solidarity to achieve the goal of sustainable development of mountain ecosystem, mountain people and their livelihoods
- Filling the knowledge gaps and better communicating the anticipated impacts of climate change on mountains to global community
- Analyzing and documenting specific climate change scenarios and impacts on the mountains as well as surrounding plains
- Documenting best practices and data and information about local knowledge and adaptation activities, and sharing this with national and international stakeholders

In line with the above, the Government of Nepal also organized an International Conference of Mountain Countries on Climate Change on 5–6 April 2012 in Kathmandu. The conference brought together participants from 30 mountain countries and was successful in adopting the *Kathmandu Call for Action (KCA)* to carry forward the Mountain Initiative (MI). Having established a MI Unit within the Ministry of Environment, Science and Technology, the Government of Nepal is now in the process of formulating the global work programme as well as the national action plan to implement the MI. In this connection, we recognize the need for a dedicated fund to move the mountain initiative forward.

Considering the above mentioned facts, Nepal would like to submit the following view:

1. While appreciating the activities undertaken within the NWP, and considering the increasing vulnerability and climate adaptation needs of mountain ecosystems, Nepal is of the view that the mountain ecosystems and mountain communities including indigenous peoples and marginalized communities, especially women, need particular attention while framing adaptation programmes through the international convention processes. In this regard, Nepal proposes to establish *Mountain Ecosystems and Climate Change* as a potential new area of work under the NWP.

2. This area of work should address the concerns specific to mountain ecosystems and its people in relation to the impacts, vulnerability and adaptation to climate change. This new area of work will also provide insights to integrate community and ecosystem-based adaptation while ensuring a sustained supply of goods and services to the people living in the downstream areas.

3. The new area of work should be guided by the existing tools, modalities and methodologies under the NWP.

Paper no. 9: Russian Federation

Предложения о продолжении Найробийской рабочей программы по уязвимости и адаптации к изменениям климата
(потенциальные будущие направления по Найробийской рабочей программе)

Современные вызовы устойчивого развития – дефицит пресной воды, энергии, продовольствия, сокращение биоразнообразия, рост числа и интенсивности стихийных бедствий, деградация почв и другие во многом обусловлены изменением климата. В связи с этим необходимо, чтобы мировое сообщество уделяло все большее внимание проблемам адаптации к происходящим и ожидаемым климатическим изменениям, вместе с анализом и прогнозированием угроз, возникающих в данной сфере. Основу этих действий должны составить научные исследования, направленные на выявление таких угроз на глобальном, региональном и национальном уровнях, а также разработка мер адаптации, включая инфраструктурные и технологические инновации. В связи с этим РФ предлагает включить в число будущих направлений Найробийской рабочей программы следующие приоритеты:

1) Уменьшение разрыва между потребностями в климатической информации и возможностями климатической науки, а также управлением климатическими рисками. Значительная неопределенность оценок будущих региональных изменений климата серьезно осложняет разработку и принятие эффективных политических и экономических решений. Для преодоления указанной неопределенности и дефицита информации нужно качественно поднять статус и увеличить финансирование научных исследований по всему спектру проблем адаптации и смягчения антропогенного воздействия на климат. Развитие и применение дорогостоящих высоких технологий, включая супер-компьютеры и спутниковые системы, в исследованиях климата, а также создание и развитие Глобальной рамочной основы климатического обслуживания (ГОКО) в данном контексте не имеют альтернативы.

2) Адекватная интерпретация научных результатов для лиц, принимающих решения, а также для бизнеса, широкой общественности и СМИ. Диалог между производителями климатической информации (научным сообществом) и ее потребителями (органы государственного управления, бизнес, население) нуждается в безотлагательном и коренном улучшении. Необходимо преодолеть размытость соответствующего понятийного аппарата, в первую очередь, самой категории «адаптация», а также сопряженных понятий (в частности, «зеленый рост», «зеленая экономика» и т.п.).

3) Более полный, комплексный и взвешенный учет проблем коренных и малочисленных народов, а также менее имущих слоев населения, которые более уязвимы к последствиям изменения климата. Поэтому принципы утилитаризма, зачастую доминирующие в указанной политике, должны уступить место этике социальной справедливости и социальной ответственности бизнеса с особым вниманием к указанным группам населения, в том числе вопросам адаптации

системы здравоохранения коренного населения, всемерной поддержки традиционного уклада их образа жизни, правовой и экономической поддержки адаптации традиционного природопользования к меняющимся условиям при разработке специальных государственных программ снижения негативных последствий изменения климата. В то же время в максимальной степени должны быть востребованы опыт и знания коренных народов при развитии сети мониторинга изменений климата и разработке планов адаптации населения климатически уязвимых регионов.

4) Дальнейшее усиление роли и социальной ответственности бизнеса. Хотя в технологических аспектах решения проблемы адаптации к изменению климата бизнес нередко идет впереди других экономических субъектов, цели долгосрочного развития объективно требуют существенно большей заинтересованности и вовлеченности бизнеса. Все это требует от ученых соответствующих проработок и обоснований по финансовой и налоговой политикам стран, направленных на стимулирование участия бизнеса в решении проблем адаптации.

5) Последовательное наращивание полноты и качества данных о состоянии и изменении климата. Международное сотрудничество в области глобальных гидрометеорологических наблюдений необходимо продолжить и последовательно расширять, также как и наращивание внимания правительствами всех стран мира к повышению качества данных наблюдений за климатической системой.

Paper no. 10: Sri Lanka

As a vulnerable nation and having fragile ecosystems, Sri Lanka expects to have special emphasis on mountain ecosystems through future works of Nairobi Work programme. Sri Lanka has been divided into 3 climatic zones such as wet zone, intermediate zone and dry zone and 46 agro ecological zones. Most of these regions are vulnerable to the adverse impacts of climate change. Sri Lanka can identify the significant variation of rainfall patterns and temperature escalations and it caused for the changes in ecosystem services and the vegetation patterns. Currently Sri Lanka is experiencing on the scarcity of water in dry zones including mountainous areas.

Mountainous ecosystems provide major role for enriching catchment areas of most of the rivers in Sri Lanka, regulation of hydrological cycle and the gaseous composition of the atmosphere, generation and maintenance of fertile soils, prevention of soil erosion, preservation of genetic resources etc. In the context of Sri Lanka, one of the major economical drivers is the tea industry. Sri Lanka is the world's third largest tea producer and the tea industry is one of the country's main sources of foreign exchange and annually contributing for 12% of the GDP in Sri Lanka. Tea plantations have been mainly established in mountainous areas of Sri Lanka and it is particularly rain fed farming crop. Accordingly, tea is highly vulnerable for the impacts of climate change. Taking in to account this situation, paying special attention on sustainable mountainous development is an urgent need.

One of the latest inclusions on the list of World Heritage Sites, under UNESCO, is the Central Highlands region of Sri Lanka. This region is located in the south-central wet zone with mountainous ecosystems of the island. There are some of the most important conservational ecosystems of the country, including the Horton Plains National Park, the Peak Wilderness Protected Area, and the Knuckles Conservation Forest. This area is about 2,500m above sea level, and hosts an extraordinary variety of endangered flora and fauna, which are not found anywhere else in the country. Therefore, protecting these ecosystems, which are highly vulnerable to the adverse impacts of climate change, are highly significant.
Taking into consideration this situation paying special attention on mountainous fragile ecosystems during the climate change negotiation as well as inclusion of future works of Nairobi Work programme is highly recommended by Sri Lanka.

Further, Sri Lanka also requests to pay attention for the paragraphs 210-212 on **mountainous ecosystem** of the outcome of Rio+ 20 Conference. Accordingly, international support for the development of mountainous ecosystem is an urgent need.

Paper no. 11: Uzbekistan

The view of Republic of Uzbekistan on potential future areas of work of the Nairobi work programme in the area of impacts, vulnerability and adaptation to climate change

Republic of Uzbekistan recognizes the importance, supports the activities and highly appreciates the achievements and contribution of FCCC Secretariat on the implementation and further development of Nairobi work programme in the area of impacts, **v**ulnerability and adaptation to climate change.
According to item 2 of decision of 17th Session of COP of UN FCCC Uzbekistan wishes to present its view and wishes which, to its opinion will facilitate the consideration of the potential future areas of actions on Nairobi work programme (NWP).

Uzbekistan thinks that it is necessary to deepen the activities on the improvement of awareness of threats and risks of climate change, vulnerability to it and need in adaptation actions and measures at the global, regional, national and local levels which requires the facilitation of work on the improvement of awareness, issue and wider dissemination and use of information products of NWP in different languages, especially tutorial aids for different age and social groups of population.
The support to developing countries in strengthening the capacity of systems of forecasting and climate service, as well as systematic observations and relevant studies in the area of impacts, **v**ulnerability and adaptation to climate change.

It is necessary to facilitate the regular updating of strategies and action plans on adaptation at the national, local and sectoral levels, study of interrelations of adaptation actions with sustainable development, regarding new knowledge and financial and social changes.

Furthermore, because of permanent development and updating of methodological base in the area of vulnerability, analysis of adaptation and adaptation technologies it is necessary to facilitate the permanent education and improvement of knowledge of experts from developing countries at national and local levels, including training in different adaptation area on the base of international experience and in the framework of demonstration projects including preparation of project proposals on adaptation for international funds.

It is also necessary to promote the efforts on the assessment of technological needs for adaptation, development, transfer and dissemination of adaptation technologies, assessment of possibilities of their promotion in different stages, at the national, local and community levels. For this the strengthening of mechanisms for technology transfer and development of synergy between NWP and Mechanism of technologies being set up in the framework of UN FCCC is required.

It is necessary to note again the importance of synergy between the activities of NWP and other programs under FCCC framework – such as Adaptation Committee, Kankun adaptation framework, National adaptation plans.

Paper no. 12: International Centre for Integrated Mountain Development

Official Submission to UNFCCC Secretariat
by ICIMOD, Kathmandu (NWP member)

Proposal for a Potential Future Area of Work of the Nairobi Work Programme: Mountains and Climate Change

Preamble

Recalling Decision 6/CP.17 on the Nairobi Work Programme on impacts, vulnerability, and adaptation to climate change, under which the 17th Conference of the Parties (COP-17) requested the Subsidiary Body for Scientific and Technological Advice (SBSTA) `to reconsider the work areas of the Nairobi Work Programme and make recommendations to the Conference of the Parties including identification of potential future areas of work that could also support the scientific and technical work under the Cancun Adaptation Framework' and invited the Parties and relevant organizations to submit their views to the Secretariat, the International Centre for Integrated Mountain Development (ICIMOD), (www.icimod.org), as an active member in the Nairobi Work Programme (NWP), takes this opportunity to express its views on a potential future area of work of the NWP on mountains.

Rationale of the Proposal

Mountains ecosystems are globally significant. They occupy 24% of the global land surface area and are home to 12% of the world's population. About 10% of the world's population depends directly on mountain resources for their livelihoods and an estimated 50% of the world's population depends, directly or indirectly, on mountains for their water supply. Fifteen percent of the global energy supply comes from hydroelectricity sourced from mountains, and mountain ecosystems are rich sources of biodiversity, agro-biodiversity, and medicinal, aromatic, and dye plants. Mountains also provide nutritious foods, mineral resources, and recreation destinations, and possess rich bio-cultural heritage.

For example, the Hindu Kush Himalayas (HKH), also known as the water towers of Asia, are the source of 10 major river systems that provide water, forests, biodiversity, and other vital ecosystem goods and services to support the lives and livelihoods of more than 1.3 billion people. The region includes four global biodiversity hotspots, 488 protected areas, 330 Important Bird Areas, and 60 global eco-regions. It is also home to more than 40 per cent of the world's poor and faces extreme vulnerability and risks due to climate and other changes.

The Hindu Kush Himalayan region is regarded as one of the region's most vulnerable to climate change. At high altitudes in the Himalayas, temperatures have been warming at a rate three to five times the global average. This warming has resulted in increased snow and glacial melt and a rise in the frequency of extreme events such as devastating floods and droughts. This has exacerbated problems of poverty and food insecurity that was already major challenges in the region, which hosts around 45% of the world's poor. Among 170 countries evaluated in the Climate Change Vulnerability Index, which ranks the vulnerability to the impacts of climate change over the next 30 years, Bangladesh ranked 1st, India 2nd, Nepal 4th, Afghanistan 8th, Myanmar 10th, and Pakistan 16th – all very high.

ICIMOD's Proposal: Mountain and Climate Change as the Future Work Area of the NWP

Despite the global significance of mountain ecosystems and evidence of disproportionate impacts of climate change in mountain regions, the UNFCCC process has yet to recognize mountain ecosystems as regions of high vulnerability. UNFCCC instruments for mitigation and adaptation

finance, transfer of technology, and capacity building have not covered mountain regions, such as the HKH, on a par with coastal areas and small islands.

Recognizing this, the Government of Nepal hosted an International Ministerial Conference on Mountains and Climate Change, 5–6 April 2012, which was attended by ministers and heads of UNFCCC delegations from around 30 countries, including Qatar, the host of COP-18. The conference issued the Kathmandu Call for Action 2012 to promote the global Mountain Initiative.[1] ICIMOD supports this call and is of the view that mountains and mountain communities, including poor and marginalized men, women, and children as well as indigenous peoples, need special treatment under the instruments of the UNFCCC to cope with and adapt to the growing implications of climate change impacts on their habitats, livelihoods, and cultures.

Given the pressing need for an immediate and urgent response to build the resilience of mountain ecosystems and to help their inhabitants better adapt to the impacts of climate change, ICIMOD on behalf of its stakeholders and partners proposes the inclusion of a new work programmme called '**Mountains and Climate Change'**. Such a programme is imperative because mountains provide vital goods and services to more than half of the world's population while simultaneously bearing a larger share of the burden that has resulted from anthropogenic climate change.

ICIMOD's proposal to establish a new area of work on **Mountains and Climate Change** under the Nairobi Work Programme will be supported by the governments of mountain countries and regional centres of excellence with mountain expertise. The proposed new area of work may focus on instruments of adaptation and mitigation and building resilience, specifically by identifying mountain ecosystem-based adaptation needs, special provisions for financial support to mountain countries, the transfer of technology, and capacity building. Emerging areas such as REDD+ and the work programme on loss and damage could also be linked to future areas of work on mountains.

[1] The Mountain Initiative aims to highlight the specific problems faced by poor and vulnerable countries with large mountainous territories in the world (see http://moenv.gov.np/newwebsite/moe_admin/download/Kathmandu%20call%20for%20action.pdf).

Paper no. 13: Secretariat of the Convention on Biological Diversity

Potential Future Areas of Work of the Nairobi Work Programme

Views from the Secretariat of the Convention on Biological Diversity

The Secretariat of the Convention on Biological Diversity (CBD) is pleased to present the following submission on potential future areas of work of the Nairobi work programme on impacts, vulnerability and adaptation to climate change (NWP) as called for in Decision 6/CP.17.

The Secretariat draws attention to the relevant work already undertaken under the CBD. This includes a technical assessment prepared by the CBD Second Ad hoc Technical Expert Group on Biodiversity and Climate Change published as CBD Technical Series No.41[1]. On the basis of this, the Conference of the Parties adopted relevant guidance in its decision X/33 paragraph 8.[2]

This submission is based on obstacles, gaps and areas for further action with regards to the links between biodiversity and climate change identified by Parties to the CBD[3] as well as the CBD Second Ad hoc Technical Expert Group on Biodiversity and Climate Change.

In summary, the Secretariat of the CBD suggests that the NWP may wish to consider the following future areas of work:

- Producing technical papers on (1) the economic, health and other impacts of climate change on biodiversity based livelihoods, and strategic options for adaptation and resilience, (2) measures to enhance adaptation including the potential risks, benefits and limitations of assisted migration and (3) gender and adaptation;
- Issuing a call for action on improved bioclimatic modeling;
- Convening an expert group on traditional knowledge, innovations and practices and climate change impacts and vulnerability;
- Calling for further submissions of case studies on (1) climate change adaptation for biodiversity and (2) the application of Strategic Environmental Assessments and Environmental Impact Assessments within climate change adaptation;
- Ensuring that any follow-up to the workshop on ecosystem-based approaches to adaptation fully considers trade-offs.

In order to facilitate consideration of the above suggested future areas of work the following document has been prepared concerning impacts and vulnerability (Section 1), climate change adaptation (Section 2), and enhanced stakeholder participation (Section 3).

[1] http://www.cbd.int/doc/publications/cbd-ts-41-en.pdf
[2] http://www.cbd.int/doc/decisions/cop-10/cop-10-dec-33-en.pdf
[3] Refer to document UNEP/CBD/SBSTTA/16/9: Proposals on Integrating Biodiversity Considerations into Climate Change-Related Activities, Including Addressing Gaps in Knowledge and Information, http://www.cbd.int/doc/meetings/sbstta/sbstta-16/official/sbstta-16-09-en.pdf ; and SBSTTA recommendation XVI/8: http://www.cbd.int/doc/recommendations/sbstta-16/sbstta-16-rec-08-en.pdf

1. Impacts and Vulnerability

Economic Analysis

Significant advances have been made recently in quantifying the value of ecosystems and their biodiversity, but these values are not yet widely incorporated into climate change impact assessments. As such, there is scope for additional work on the costs of biodiversity loss within the evaluation of climate change impacts and vulnerability. This includes the need for additional information on the impacts of climate change on biodiversity-based livelihoods.

This could be supported by the NWP through a technical paper on the economic impacts of climate change on biodiversity based livelihoods including an analysis of literature on the contribution of biodiversity to reducing impacts and vulnerability.

Improved Access to Data

Although our understanding of the impacts of climate change on biodiversity has improved significantly, further efforts to assess impacts are hampered by a lack of baseline data on biodiversity and climate change, especially within developing countries. Specific data needs include:

i. spatially explicit biodiversity data;
ii. readily available downscaled probabilistic projections of climate change, including projections of extreme events and changes in temperature and precipitation patterns;
iii. information on the magnitude of the CO_2-fertilization effect in the terrestrial and marine biosphere and its components over time; and
iv. global-scale satellite monitoring programmes capable of tracking species-level responses to climate change.

As the data needed in this regard is linked to work under both the CBD and the NWP, there is scope for enhanced collaboration between the two processes concerning the aggregation and dissemination of data and calls for action for future research. This enhanced collaboration could be further explored through the Joint Liaison Group of the Rio Conventions.

Biodiversity and Bioclimatic Models

Modelling impacts and vulnerability continues to improve however the predictive ability of bioclimatic models requires improvement. In particular:

i. The projections of bioclimatic models should be formally tested against observed species range shifts;
ii. Models that take into account the interactions between species, and between trophic levels should be further elaborated and used;
iii. Climate-change impact assessments should optimally be integrated with assessments of other stressors to ecosystems;
iv. Improvements are needed in the integration of feedback mechanisms in order to address differences between modeled changes and observed impacts;
v. Models linking climate change and ecosystems can also be coupled to models of human behaviour and decision-making, thus representing key interactions between social and ecological systems.

The NWP could support the above through issuing a call for action to enhance bioclimatic models and through preparing, with the World Meteorological Organization, options for addressing the above gaps for the consideration of partners and Parties.

Traditional knowledge, innovations and practices

Observations from indigenous and local communities and other vulnerable groups often form an important component of impact and vulnerability assessments. In particular, such observations are often able to identify early impacts and can build on many years of knowledge and experience where scientific records may not exist or may be inaccurate.

The NWP could promote the enhanced integration of traditional and local knowledge within climate change impact and vulnerability assessments with free prior and informed consent and with the full and effective participation of indigenous and local communities.
Examples of supporting activities include:

i. Promote the documentation and validation of traditional knowledge, innovations and practices;
ii. Revitalize traditional knowledge, innovations and practices on climate change impacts on traditional biodiversity-based resources and ecosystem services through education and awareness-raising, including in nomadic schools;
iii. Explore uses of and opportunities for community-based monitoring linked to decision-making, recognizing that indigenous people and local communities are able to provide data and monitoring on a whole system rather than single sectors based on the full and effective participation of indigenous and local communities.

In order to achieve the above, the NWP could convene an expert group on traditional knowledge, innovations and practices and climate change impacts and vulnerability and strategic options for adapation.

2. Climate Change Adaptation

Mainstreaming actions for biodiversity adaptation

Ecosystem-based approaches to adaptation are increasingly being recognized within climate change adaptation plans and programmes, however such approaches are only sustainable if steps are taken to ensure that the biodiversity delivering relevant ecosystem services is able to adapt to climate change. Furthermore, biodiversity has significant value beyond adaptation that should be preserved through biodiversity adaptation plans.

The NWP could continue to explore and build awareness of steps that can be taken to improve the adaptive capacity of biodiversity in light of the projected negative impacts of climate change including through:

i. Restoring or rehabilitating fragmented or degraded ecosystems;
ii. Ensuring that ecosystem-based approaches to climate change help biodiversity adapt to climate change in addition to people and societies;
iii. Preserving and enhancing protective ecosystem services so as to demonstrate the value of such ecosystems;
iv. Ensuring that any use of renewable natural resources is sustainable under the impacts of climate change.

This could be accomplished through encouraging the submission of geographically well distributed case studies and good practice examples in (i) providing beneficial conditions for natural adaptation of species and ecosystems; (ii) adapting restoration practices to respond to climate change; (iii) the assisted relocation of species affected by climate change, and (iv) the *ex situ* conservation of biodiversity that is unable to adapt to climate change.

Improve the understanding of assisted migration

In some cases, biodiversity may not be able to persist in current habitats under changing climate conditions. Although the natural response of species will include shifting habitats, some species will not be able to move as a result of either low mobility or high isolation. In such cases, assisted migration may be considered as an option. However, although in some instance they may be the only viable option, there are limitations, risks, uncertainties, and often high costs associated with assisted relocation techniques.

Relocated species become "introduced" species to the new habitat, with potential to cause negative impacts on indigenous species. Such impacts, which may include disruptions of predator-prey interactions or symbiotic interactions, changes in parasitism rates and potential competition with existing species for limited resources, need to be assessed in advance of any relocation intervention. In order for relocation to be successful it will often be necessary to move many individuals into the new area at once – increasing the possibility of ecosystem disruption at the new spot. It is also likely that not just one species needs to be relocated but rather multiple components of ecosystems and this assumes that the necessary functions of the components of a natural ecosystem for species to survive and thrive are understood.

Given the complexity of assisted migration, the NWP may wish to produce a technical paper on assisted migration within the framework of climate change adaptation.

Analyse trade-offs associated with ecosystem-based approaches to adaptation

Ecosystem-based approaches to adaptation may require managing ecosystems to provide particular services at the expense of others. When trade-offs are understood and considered an informed decision can ensure the long-term sustainability of adaptation measures. When trade-offs are unknown or ignored unintended consequences may counteract the positive achievements of investments in ecosystem-based approaches to adaptation.

It is therefore important that decisions to implement ecosystem-based approaches to adaptation consider trade-offs within the broader framework of ecosystem management. As such, the NWP could ensure that the follow-up to the workshop on ecosystem-based approaches to adaptation fully consider trade-offs, including ways and means to assess trade-offs.

Building information and awareness of the impacts of climate change adaptation on biodiversity

Climate change adaptation can have positive, negative or neutral impacts on biodiversity. Improving the understanding of the potential impacts of adaptation activities on biodiversity can support the achievement of multiple benefits and avoid unintended consequences. This can be accomplished through mainstreaming Strategic Environmental Assessments and Environmental Impact Assessments within climate change adaptation.

The NWP may wish to call for submissions on the application of Strategic Environmental Assessments and Environmental Impact Assessments within climate change adaptation.

3. Enhanced Stakeholder Participation

Given that climate change impacts will be felt by all, it is important that, moving forward, the NWP takes concrete steps to ensure the full and effective participation of stakeholders. This requires (i) the identification of relevant stakeholders, including within the private sector; (ii) an understanding of their interests (economic and non-economic); (iii) awareness raising for stakeholders to fully understand projected impacts; (iv) local and, where relevant, regional consultations; and (v) the establishment of a mechanism for reporting and feedback.

Furthermore, given the important role of women in climate change adaptation, the NWP should support gender mainstreaming in adaptation. As such, it is suggested that the NWP produce a technical paper on gender and adaptation building on the work already undertaken by the Joint Liaison Group to the Rio Conventions and in close collaboration with UN Women.

Paper no. 14: United Nations Convention to Combat Desertification

Submission by the United Nations Convention to Combat Desertification
on Decision 6/CP.17
containing views on elements to be potentially included as future areas of work of the Nairobi Work Programme (NWP):
The role of the UNCCD convention (Parties and secretariat) in holistically addressing the issues of Sustainable Land Management (SLM) and the implications of recurrent droughts to the long term objectives of the NWP
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Linkages between the NWP and the UNCCD long term objective

The overall objectives of the Nairobi Work Programme (NWP) are intimately linked with the long-terms objectives of the UNCCD. The first can be summarized as follows:

1. The NWP is called to first assist all UNFCCC Parties, including developing countries, the least developed countries and small island developing States, to improve their understanding and assessment of impacts, vulnerability and adaptation; and second, to assist all UNFCCC Parties to make informed decisions on practical adaptation actions and measures to respond to climate change on a sound scientific, technical and socio-economic basis, taking into account current and future climate change and variability.
2. The UNCCD strategic objective relates with the vision of the 10-Year Strategy adopted by the UNCCD parties in 2007: To forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability.

The role of land and soil in the implementation of the NWP

With the overall objectives of the Nairobi Work Programme (NWP) in mind, the UNCCD secretariat considers the political momentum of Rio+20 with respect the sustainable development target to achieve Land Degradation Neutrality (LDN) through a target of Zero Net Land Degradation (ZNLD) for 2030.

Currently, human activity is the major cause of global change, including climate change, desertification and drought. There are clear evidences of the increasingly rates of growth of the carbon in the atmosphere, on the degradation of water resources, on biodiversity loss and on the risks of not protecting soil productivity. The predominant economic development models tend to degrade land, biodiversity, water resources, and the atmosphere; to act on these it is required a forward-looking and holistic approach focusing on the nexus that food, water and energy have.

Increase in demand for food, for energy and for water

There are several pressures exerted to land: increasing population growth, the concomitant demand for food (expected to increase by 50% when compared with the current levels) and for energy and water (increasing similarly by 40%) the physical needs for additional land to produce the resources and materials needed for these growing demands would require to add to production some 1.2 million square kilometers by 2030.
Pressure on land comes also from competing uses for agriculture (food and biofuels) forestry, pasture, urbanization and raw materials.

These pressures create Land Degradation

The main causes of land degradation and desertification is the unsustainable use of land, often exacerbated by policy failures. Climatic variations, such as recurrent droughts may also worse land degradation.

Dryland, a special case

Dryland because of aridity and water scarcity are particularly fragile to unsustainable land management practices that ultimately could lead to land degradation and desertification. Drylands are home to more than one third of the global population, and make up around 44% of all the world's cultivated systems and account for 50% of its livestock.

Land Degradation Neutrality (LDN): A Sustainable Development Goal on Land Management

The focus for a LDN goal could be included into the NWP in degraded and non-degraded areas. In the latter the aim could be to avoid land degradation. In the former, policies and measures aiming at protect soil organic matter, preserve

water and nutrient resources, and maintain vegetative cover and conserve biodiversity should be at the core of the adaptation programmes. One such adaptation programme that is proposed is the Zero Net Land Degradation (ZNLD) over a given period of time, for non-degraded land to remain intrinsically healthy and for already degraded-land to be restored.

The underlying targets of the NWP should be formulated with ZNLD in consideration

Land is one building blocks to adaptation to climate change. Sustaining soil and restoring degraded land can ensure improved livelihoods and more resilient ecosystems: food security, rural poverty alleviation, reduction of hunger and resilience building to environmental challenges.

The NWP can be part of a more coordinated international framework, addressing land degradation reduction rates. The UN Convention to Combat Desertification (UNCCD) is the only legally-binding instrument, linking environment and sustainable development to SLM and drought management. SLM practices have the potential to simultaneously deliver environmental benefits and improved livelihoods.

This target-setting initiative can be complemented by assessing the cost of not acting under the NWP on land and drought issues.

On drought management and mitigation

Drought is a natural and recurring part of the normal climate cycle and it is also a devastating threat to livelihood, subsistence and vulnerability of poor and rich communities, but especially put at greater risk sectors of the rural world, resulting in negative impact in developing countries (especially LDCs and SIDs).

Even though drought occurs globally with different intensity and frequency, the impacts can depend on the different degrees of social, economic and environmental vulnerability. Africa and Asia are the most drought prone regions of the world. Latin America and the Caribbean suffer droughts that put at risk their food, water and energy production. Addressing drought requires, then, proper knowledge on the social and economic conditions of each country of each region of the developing world, linked with the status and availability of their natural resources, their socio-political vulnerability, and the disposal of financial resources. The level of drought preparedness and commitment to drought risk management can be made more coherent and consistent with the impacts caused by climate change, impacting on the frequency and intensity of droughts.

Drought and land

Drought is a complex occurrence comprised by temperature and rainfall. The relative water availability (or scarcity) on the surface and in soil, as well as their retention capacity play a key role on droughts and their duration and extent. Population growth is as well an issue for drought mitigation and in vulnerable areas of intensive agriculture (for food or biofuel) intended to supply the urban consumption and exports.

UNCCD proposal of some agenda items for governance, poverty and sustainable land management, accounting for conservation of land and soils as needed natural capital under the future programme of work of the NWP

- Work towards an internationally agreed set of sustainable development goals that are feasible and achievable. The target on zero net land degradation must be at the core of such SD goals.
- Assist governments in creating enabling environments for SLM by improving local decision-making, infrastructure and education; harmonizing natural resource strategies and policies; and supporting appropriate investment policies for natural resource conservation
- Promote the concept of value chains, by working with the private sector and public-private entities to develop tools (such as eco-labeling) that encourage sustainable land management, sustainable production and consumption
- Encourage diversification of income streams and livelihoods, with a focus first on drylands and on local communities of other degraded ecosystems, to reduce land-use pressures with food security as priority issue
- Encourage the intensification of water-efficient agriculture for food security and of renewable energy options, by adopting sustainable land management practices

- Work towards reducing transaction costs for investments in SLM, for example by promoting risk management and climate-aware technologies (focusing as well in drylands)
- Support public and private investments in drylands and other areas under land degradation processes by among others, matching them with carbon sequestration, integrated water management and renewable energy goals
- Support social protection, for example by using scenario modeling to forecast winners and losers, or virtuous and vicious outcomes, of adopting certain investment proposals, taking into consideration impacts related to gender and age.
- A permanent dialogue on drought is called upon, in which advancement on the implementation of the NWP is a must.

ZNLD can be a crucial element of the NWP

- Rising up collective awareness, of women and men, indigenous and local communities, through programmatic information, education and capacity development, on governance and natural resource management and adaptation, starting with SLM.
- Improving scientific and technical knowledge and research, in particular with respect to impact on ecosystems geography, technical adaptation responses and migratory flows.
- Developing institutions, administrations, public-private initiatives and support to civil society organizations with proper managerial and planning capabilities at the local level, accounting for action on food-energy-water needs that women and men in local communities in conservation areas set forth as priorities.
- Fostering technology transfer and research for SLM as the basis for food security, water and energy production; i.e., adapting agriculture / using SLM according to climate variability conditions.

Paper no. 15: United Nations High Commissioner for Refugees, United Nations University, Norwegian Refugee Council and its Internal Displacement Monitoring Centre and the International Federation of Red Cross and Red Crescent Societies

Future work areas of the Nairobi work programme (NWP)
Views of the Office of the United Nations High Commissioner for Refugees, UN University, the Norwegian Refugee Council and its Internal Displacement Monitoring Centre and the International Federation of Red Cross and Red Crescent Societies (IFRC)

22 October 2012

Introduction

The following views respond to the COP decision adopted in Durban, inviting Parties and relevant organizations to submit views on potential future areas of work of the Nairobi work programme (NWP).[1]

These views are premised on the NWP's twin objectives: "to assist all Parties, in particular developing countries, including the least developed countries and small island developing States (SIDS), to improve their understanding and assessment of impacts, vulnerability and adaptation, and to make informed decisions on practical adaptation actions and measures to respond to climate change on a sound, scientific, technical and socio- economic basis, taking into account current and future climate change and variability."[2]

At COP 16 in Cancun, the Parties adopted the Cancun Adaptation Framework (CAF) which notes that "enhanced action and international cooperation on adaptation is urgently required to enable and support the implementation of adaptation actions aimed at reducing vulnerability and building resilience in developing country Parties, taking into account the urgent and immediate needs of those developing countries that are particularly vulnerable."[3] Furthermore, the CAF specifies nine activities that constitute enhanced action.[4]

Supporting activities described in Paragraph 14 (a – i) of the CAF is compatible with the NWP's objectives and existing work areas. As a result, providing knowledge and evidence to support the implementation of the CAF should guide the direction of the NWP. Parties' implementation of many of these activities can draw upon existing knowledge and evidence consolidated under the NWP and its partners. However, significant gaps remain with respect to some of the activities described in Paragraph 14. Therefore, within its broader support of the implementation of the CAF, the NWP should give priority to addressing these evidence gaps, and it should therefore use these gaps as a basis for selecting future work areas.

Work area on "climate change induced displacement, migration and planned relocation"

Norway and Switzerland launched the Nansen Initiative on disaster-induced cross-border displacement on 2 October 2012, prompted by Paragraph 14(f), that categorizes as adaptation —"measures to enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation, where appropriate, at the national, regional and international levels"—and by the conviction that national, regional and international responses and the legal/normative framework applicable to human mobility challenges, particularly disaster-induced cross-border displacement, remain inadequate to date. The Nansen Initiative addresses the need for a more coherent and consistent approach to the protection of people displaced externally, i.e. across national borders, including but not limited to those triggered by climate change. The overall goal is to build consensus on key principles and elements regarding the protection of persons displaced across borders that sets the agenda for future action at domestic, regional and international levels.

[1] FCCC/SBSTA/2011/L.26/Add.1.
[2] Decision 2/CP.11, Annex, Paragraph 1. FCCC/CP/2005/5/Add.1.
[3] Decision 1/CP.16, Paragraph 11. FCCC/CP/2010/7/Add.1.
[4] Ibid., Paragraph 14 (a – i).

One significant knowledge and evidence gap concerns CAF Paragraph 14 (f). While there has been considerable progress made on this issue during the last decade,[5] much more evidence—at policy-relevant spatial and temporal scales—is needed to support decision-making on matters relating to climate change induced displacement, migration and planned relocation.

Addressing displacement and migration associated with climate change and climate-related hazards is already a matter of urgent concern. In 2008, 20.3 million people were displaced by climate-related hazards; 15.2 million, 38.3 million and 13.8 million were displaced in 2009, 2010 and 2011, respectively.[6] These figures would be even higher if they accounted for people displaced owing to slow-onset climate hazards such as droughts and desertification.

As the recent IPCC special report *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* indicates, the magnitude of population movements is likely to increase due to the impacts of climate change on vulnerable exposed communities.[7] Most of the existing climate-related displacement and migration occurs—and will likely continue to occur—in developing countries that are vulnerable to climate change impacts. For example, 14 of the 15 countries with the highest number of disaster-displaced people in 2011 were developing countries.[8]

Helping developing countries vulnerable to climate change design and implement their national adaptation plans (NAPs) is at the core of the CAF. It is the role of the NWP to help marshal the appropriate evidence needed to inform these plans based on an accurate assessment of potential impacts and the effectiveness of available options. The NWP and its partners should identify gaps and orient future work around them.

Conclusion

The manner in which population mobility prompted by climate change is managed can either increase the adaptive capacity or, on the contrary, augment the vulnerability of at-risk communities. The insufficient amount of evidence concerning climate-related displacement, migration and planned relocation represents one very important gap. For low-lying SIDS, this gap is a vital concern. By identifying climate-related population mobility as an area of work, NWP would help address this evidence gap and increase the coherence among Convention mechanisms including, but not limited to, the Adaptation Committee, the work programme on loss and damage and the NAPs process.

[5] See, for example: Foresight: Migration and Global Environmental Change (2011) Final Project Report, the UK Government Office for Science, London.
[6] IDMC, 2012. *Global Estimates 2011: People displaced by natural hazard-induced disasters.* Internal Displacement Monitoring Centre, Geneva.
[7] IPCC, 2012. *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change* [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp.
[8] IDMC, 2012.

Paper no. 16: World Meteorological Organization

WMO UPDATES AND INPUT ON NAIROBI WORK PROGRAMME (NWP)

SEPTEMBER 2012

Introduction

This input covers primarily updates on contribution of the World Meteorological Organization (WMO) and of its co-sponsored bodies Global Climate Observing System (GCOS) and World Climate Research Programme (WCRP) to the Nairobi Work Programme (NWP). Noting that the Global Framework on Climate Services (GFCS) will enter implementation phase after October 2012 to further contribute to the areas of work mentioned in this report, WMO suggests that these activities continue in the future structure of the NWP, to ensure consistency and further maturity of the outcomes for adaptation practices.

1 Data and observations

1.1 Developments for improvement of data policy

At the request of the Sixteenth World Meteorological Congress (Cg-XVI), in the context of the requirements for implementation and sustained operation of the GFCS, WMO is exploring ways to facilitate international exchange of climate data and products, including a review of the existing Resolution 40 (Cg-XII, 1995) – WMO policy and practice for the exchange of meteorological and related data and products including guidelines on relationships in commercial meteorological activities, with a view to including therein the climate data and products needed for climate services.

From the perspective of climate data requirements in the realm of the GFCS, Resolution 40 (Cg-XII) is considered to be limited by the narrow scope of meteorological data and products that it covers. The new effort on the exchange of information of meteorological and related data could be improved and promoted by analysis of the practice of application for all types of data in the WMO Member countries.

Considering that over the two past decades significant changes have occurred in data, technology, and policies within countries, and that progress has been made in identification of requirements, the WMO Executive Council has established a Task Team on the WMO Policy for International Exchange of Climate Data and Products to Support the Implementation of the Global Framework for Climate Services.

Taking into account the outcomes of the 2012 Extraordinary World Meteorological Congress to be held in October 2012 and new developments within WMO related to the exchange of data and products, for example, the WMO Integrated Global Observing System and the WMO Information System, the Task Team shall study the implications of, and the potential for, applying the principle of free and unrestricted exchange of data and products, while respecting national policies, for the provision of climate services, including identification of examples of climate data and products that are available. It will also consider how other United Nations agencies and international organizations can collaborate with WMO on the exchange of data and products that will support the provision of climate services.

WMO recognizes the importance of addressing new and evolving requirements for climate data for improved climate monitoring products and services that would support the analysis and assessment of climate extremes, climate change adaptation at regional and national levels, issuing early warnings and perform climate watches.
WMO reiterates the importance of safeguarding, digitizing and making accessible historical climate archives available on paper format and modernizing obsolete electronic archives, such as those available on old magnetic tapes and floppy disks. These activities underpin the development of climate services by NMHSs and support achieving the objectives of the WMO Data Rescue (DARE) project.

1.2 Developments on observations- GCOS

The Steering Committee of the Global Climate Observing System (GCOS) would like to emphasize the need for a continued role of observations in the Nairobi Work Programme and for adequate climate observations to assist in the design of effective policies to address adaptation to climate change. The GCOS Programme thus intends to organize an international workshop in 2013 to consider the climate observation requirements for supporting adaptation to climate change. The workshop, which would be undertaken in cooperation with UNEP and IOC-UNESCO, would bring together representatives of the GCOS community and representatives of sectors in which adaptation to climate variability and climate change is, or is likely to become, an important concern. These would include the agriculture, water resources, health, and energy sectors and also the disaster risk reduction community. The goals of the workshop will be to identify observational requirements for adaptation, to review the Essential Climate Variables (ECVs) to determine their adequacy for adaptation, and to develop a plan to address the gaps and deficiencies identified. The workshop will be closely aligned to the implementation of the Global Framework for Climate Services, and its results will directly feed into the preparation of the next GCOS Adequacy Report, to be developed in the 2014 timeframe.

Four major outcomes will be sought, including:

1. A statement on the general adequacy of observations to support adaptation to climate variability and change and identification of further work on the assessment of adequacy that may be undertaken in preparation of the third GCOS adequacy report during 2013 and 2014 or in support of other programmes represented at the workshop;

2. Identification of the requirements for observations and their use in monitoring to support climate services addressing adaptation needs, in particular in the context of the Global Framework for Climate Services (GFCS) and related to a) water resources, b) health c) agriculture, d) coastal zone management, e) energy production, f) disaster risk reduction and g) transport;

3. Identification of the requirements for observations to support research into adaptation, such as to be undertaken under the Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA); and

4. Strategic guidance on what steps the GCOS Programme should take in the coming years to address the needs for observations for adaptation to climate variability and change, in particular in the context of its preparation of a new Implementation Plan by 2016.

2 Methods and Tools

2.1 Climate Service Information System (CSIS)

For the effective delivery of climate information, it is imperative that appropriate institutional mechanisms are in place to generate exchange and disseminate information at the global, regional and national levels on an operational basis. The Climate Service Information System (CSIS) is the principal GFCS mechanism through which information about climate (past, present and future) will be routinely collated, stored and processed to generate products and services that help to inform often complex decision making processes across a wide range of climate-sensitive activities and enterprises. The CSIS will comprise a physical infrastructure of institutes, centres and computer capabilities that, together with professional human resources, will develop, generate and distribute a wide range of climate information products and services.

The implementation strategy of the CSIS is based on a three-tiered structure of collaborating institutions (CSIS 'entities') that will ensure climate information and products are generated, exchanged and disseminated:

a) at the global scale through a range of advanced centres;
b) at a finer regional scale through a network of entities with regional mandates; and
c) at the national and local levels by National Meteorological and Hydrological Services (NMHSs) and their partners through appropriate national institutional arrangements.

A set of primary and high priority functions of CSIS can be defined to include (i) climate data rescue, management and mining, (ii) climate analysis and monitoring, (iii) climate prediction, and (iv) climate projection. These functions include processes of data retrieval, analysis and assessment, re-analysis, diagnostics, interpretation, attribution, verification and communication (including exchange/dissemination of data and products) carried out over a global-regional-national system of inter-linked producers and providers. CSIS implementation will take into account standardization, sustainability, reliability and adherence to established policies and procedures. Effective design, dissemination and uptake of CSIS products and services will require knowledge of user requirements and of their decision systems. Interaction with users for CSIS implementation and operation will require interface with users (e.g. through Regional Climate Outlook Forums (RCOFs) and collection and response to their feedback.

2.1.1 Global Producing Centres of Long Range Forecasts (GPCs)

In 2006, WMO began a process of identifying a network of Global Producing Centres for Long Range Forecasts (GPCs) that make and distribute global seasonal predictions. There are twelve officially designated WMO GPCs at present, spread over the world, operationally producing and disseminating global-scale long range forecasts to all WMO Members. Through a rigorous designation process, GPCs adhere to certain well-defined standards that support consistency and functionality among themselves. WMO has also designated two Lead Centres among the GPCs, namely the Lead Centre for Long-Range Forecast Multi-model Ensembles (LC-LRFMME) and the Lead Centre for Standard Verification System for Long-Range Forecasts (SVSLRF). LC-LRFMME collects a number of GPC real-time LRF products as well as some hindcast data, and by arrangement makes available a range of ensemble products to regional and national users in uniform formats and with common graphical displays. LC-SVSLRF is the authoritative source for mandatory verification information for all the GPCs, providing a single source for all information on the skills of the GPC products for any specific region/country in the world.

Given the fact that there are multiple sources of climate information, CSIS will actively promote consensus-based approaches, where consistent signals are present, and will help clarify aspects of uncertainty where the signals are divergent. This involves close cooperation between the concerned CSIS entities. A product exemplifying this approach is the WMO El Niño and La Niña Update, which Cg-XVI has endorsed to be expanded into a Global Seasonal Climate Update (GSCU), a more comprehensive product that will also encompass information on other factors that drive climate variations and extremes.

2.1.2 Regional Climate Centers (RCCs)

There are already a number of advanced centres providing global-scale CSIS products, though there is a need to coordinate and standardize their operations, especially with respect to the exchange of routine data and products, which will help ensure compatibility across geographical and jurisdictional boundaries. Making regional implementation a first priority gives countries that need the most help something to work with quickly, while longer-term efforts to build national climate capacity are described, funded and accomplished. At the regional level, WMO is actively pursuing the establishment of a number of formally designated WMO Regional Climate Centres (RCCs) around the world, that will generate and deliver more regionally focused, high-resolution data and products as well as offer training support on the use of their products. The aim of RCCs is to assist WMO Members in a given Region or a defined sub-Region to deliver better climate services and products including climate monitoring and long-range forecasts, and to strengthen their capacity to meet national climate information needs. A representative collection of WMO RCCs, building, where possible, on centres already in place or in planning, will form the backbone of the CSIS at the regional level. National entities under CSIS will acquire, interpret and apply the data and products from global and regional centres, and to the extent possible, will develop their own national products. Considerable capacity development will be required, especially in developing countries, to strengthen national scale CSIS operations around the world.

WMO reiterates the importance of RCCs as a key element of the CSIS/GFCS, and particularly in helping participating Member countries develop improved climate activities for provision of a wide range of climate information, and emphasized the need that RCCs be developed as centres of excellence, with adherence to standards and criteria that will ensure the highest quality products.

2.1.3 Regional Climate Outlook Forums (RCOFs)

In partnership with regional institutes, WMO has promoted Regional Climate Outlook Forums (RCOFs) around the world in Africa, Asia, South America and the South Pacific Islands which are being held regularly, and supported the initiatives by Members to establish and sustain new RCOFs in South-eastern Europe, South Asia, Southeast Asia, Northern Eurasia, the Caribbean and Polar Regions. WMO Member countries continue their support to these efforts and expand the RCOF process that serves as an excellent interface with the users of climate information in various sectors and gives wider exposure to the activities of NMHSs. In this connection, National Climate Outlook Forums (NCOFs) are also important as a logical extension of the RCOF process for NMHSs interaction with national users. WMO encourages Members to develop efficient mechanisms to organize NCOFs through appropriate partnerships with national user sectors.

2.1.4 Climate Services Toolkit

The implementation of climate services is likely to impose considerable demands upon service providers, including upon NMHSs regardless of the extent of their role in national climate service provision. In any realistic scenario, the availability of additional resources for climate service provision is inevitably going to fall short of the ideal requirements to meet the new demands. One partial solution to this problem is to make available a suite of tools that can be used by climate service providers and users to facilitate the production, communication, and application of climate information products. However, to avoid the possibility of a proliferation of inconsistent, and possibly sub-standard, tools, there is a need to implement a set of standards, and to establish a certification process for new tools. WMO has made efforts to define the purpose of such a Climate Services Toolkit (CST), to outline a set of standards, and to propose a certification process. CST consists of a set of bespoke software products (including data management, data analysis, and prediction packages), and accompanying training modules, that are specifically designed to support the generation and use of climate information and prediction products that meet user needs. WMO will sustain its efforts to build and distribute CST under the guidance of CCl to all its Members, as part of the proposed initial implementation activities of the GFCS.

3 Climate related risks and extreme events

Acknowledging that the effective assessment and management of climate risk requires an understanding of the complex interplay between the climate factors and the vulnerability of the affected sector, WMO's Commission for Climatology (CCl) to consider developing interdisciplinary knowledge, based on vulnerability information, to support its work related to Climate Risk Management and adaptation in collaboration with other technical commissions and UN agencies.

WMO, recalling that water resources will be significantly affected by potential climate change, recognized the important role that WMO's Hydrology and Water Resources Programme (HWRP) can play in helping Members in better understanding the impacts of climate change on the management of water resources and the risks linked to hydrological extremes, such as floods and droughts, and in developing adequate response and mitigation measures. WMO therefore welcomes the various initiatives aimed at fostering cooperation between the hydrological and climatological communities, the development of national adaptation strategies and the reinforcement of natural risks management capabilities.

There is a continued need for facilitating access to hydrological observations for global studies, particularly in downscaling climate information for water management and recognized the important role played by GTN-H, through the Global Runoff Data Centre (GRDC), International Groundwater Resources Assessment Centre (IGRAC) and the International Centre for the Hydrology of Lakes and Reservoirs (HYDROLARE) and the valuable contributions made by it in the generation of derived products and in support of climate change studies.
Disaster Risk Reduction (DRR) is a priority for WMO because protection of lives, property and livelihoods are at the core of the priorities of the WMO Members and the National Meteorological and Hydrological Services (NMHS). Furthermore, the implementation of the Hyogo Framework for Action (HFA) by national governments is leading to changes in national DRR policies, legal and institutional frameworks, with implications on the role, responsibilities and new working arrangements for the NMHSs. These changes provide opportunities such as increased recognition of the NMHSs by their governments and stakeholders, which could result in strengthened partnerships and increased resources. However, NMHSs face increasing demand and liabilities related to the provision of products and services to larger and more diverse group of DRR

stakeholders (e.g., government authorities, public and private sectors, NGOs, general public and media, etc.) whom have direct responsibilities for DRR decision-making. To meet these new challenges, the WMO's crosscutting DRR Programme two-tier work plan aims to facilitate better alignment of the activities of WMO constituent bodies and global operational network as well as strategic partners to assist NMHSs to:

(a) Engage effectively in the National DRR governance and institutional frameworks;

(b) Identify, prioritize, establish partnerships and service delivery agreements with national DRR user community (users);

(c) Establish partnership agreements with other national technical agencies (e.g., hydrological services, ocean services, etc.) as well as global and regional specialized centers (e.g. Global Producing Centres (GPC), Regional Specialized Meteorological Centres (RSMCs), Regional Climate Centres (RCC), Tsunami Watch Centers, etc.), with standard operating procedures;

(d) Develop and deliver core and specialized products and services for DRR decision support (e.g., hazard/risk analysis, multi-hazard EWS, sectoral risk management and disaster risk financing and risk transfer) in a cost-effective, systematic and sustainable manner;

(e) Ensure that core operational capacities (e.g., observing networks, forecasting systems, telecommunication systems, data management systems, human resources, etc.) are built upon the principles of Quality Management Systems (QMS) to support product and service development and delivery;

(f) Engage in regional and global efforts for development of risk information for large scale and transboundary hazards, through strengthened regional and global cooperation.

4 Research

The World Climate Research Programme (WCRP) is facilitating cutting edge climate research to address challenges identified in its Programme's Strategic Framework 2005-2015 "Coordinated Observation and Prediction of the Earth System". The WCRP leadership and network of affiliate researchers focuses their efforts on:

1) coordinating international climate research, modelling and prediction in support of the priorities identified by WCRP sponsors and stakeholders
2) developing a future research strategy and priorities in response to the rapidly emerging needs for science-based climate information for decision making, in close consultation with the international science community
3) participating actively in major international initiatives such as the Future Earth: Research for Global Sustainability, Global Framework for Climate Services, and Sustained Global Oceans Observations to assist in identifying the required observations, modelling and research priorities for the ensuing decade; and
4) establishing a vigorous capacity development initiative to train the next generation of scientists and research networks at the global and regional level.

The WCRP organized for the first time a major open science conference on the occasion of its 30th anniversary in October 2011 to assess the current state of knowledge on climate variability and change, consult with the international community of experts to identify the most urgent scientific issues and research challenges.

WCRP in cooperation with its sister programmes made progresses in developing high quality climate data records, especially from space-based observing systems, development of a comprehensive set of model simulations of centennial and decadal Earth/climate system projections. Twenty-six groups from around the world participate in the WCRP Couple Model Intercomparison Project (CMIP5, cmip-pcmdi.llnl.gov/cmip5/) experiments that represent the most ambitious multi-model intercomparison and analysis project ever attempted. CMIP5 model output is shared by federated centres around the world that appear like a single archive, the Earth System Grid Federation (ESGF, http://www.earthsystemgrid.org). This distributed archival and distribution capability was widely viewed as the future of accessing both model and observed data for a wide variety of applications in climate science. These efforts together will provide for the first time an unprecedented volume of data and information to be used in international science-based policy assessments such the Fifth Intergovernmental Panel on Climate Change (IPCC), international adaptation planning and risk management studies, water resources and food production analysis and assessments, and evaluation of alternative energy and transportation planning to just name a few.

Climate information at regional to local scales is needed to assess the impacts of climate variability and change on human and natural systems, enabling the development of suitable adaptation and risk management strategies at the regional to local level. Despite significant advances in the horizontal resolution of most global climate models, there are still limitations in their ability to represent important regional/local forcing features, such as complex topography, land surface heterogeneity, coastlines and regional water bodies, all of which can modulate the large-scale climate on regional to local scales. Coarse spatial resolution of models also precludes an accurate description of extreme events, which are of significant importance in assessing the societal impact of changes in climate variability. In order to foster greater progress on development and use of regional climate information, in 2008 WCRP established a modelling framework for COordinated Regional Climate Downscaling (RCD) EXperiments (CORDEX, http://cordex.dmi.dk for access to some products and several other URLs). There are now considerable CORDEX activities in Africa. Ten groups have completed the first reanalysis driven runs, 14 groups are completing different scenario runs, a diagnostic team was established from research and operational organizations in Africa to assist with evaluation of CORDEX products and to prepare scholarly papers to be published in the open literature. Twenty-two modelling groups are participating in the Euro-CORDEX, which is also producing high-resolution simulations in addition to standard 50km simulations. Mediterranean CORDEX has 11 participating groups. Plans are underway for coordinating CORDEX activities of the East Asia and South Asia domains. Some CORDEX activities are also taking place in South America. There is an important capacity development aspect to CORDEX and many training workshops have been held or are being planned for the near future in Asia, Americas and Africa. The second pan-CORDEX conference is being planned in boreal fall 2013, in Brussels, Belgium.

WCRP is now sponsoring a very active network of regional projects through partnership with national and international organizations. Some examples of regional studies that are coordinated by the WCRP core Projects include:

- The African Monsoon Multidisciplinary Analyses – AMMA (RHP),
- La Plata Basin – LPB project (RHP),
- Mediterranean Climate Variability and Predictability – MedCLIVAR,
- Baltic Sea Experiment – BALTEX (RHP),
- Large-Scale Biosphere-Atmosphere Experiment in Amazonia – LBA (RHP),
- HYdrological cycle in the Mediterranean Experiment - HyMex (RHP),

- Monsoon Asian Hydro-Atmosphere Scientific Research and Prediction Initiative - MAHASRI (RHP),
- Murray-Darling Basin – MDB (RHP),
- Northern Eurasia Earth Science Partnership Initiative – NEESPI (RHP),
- Asia-CliC,
- Variability of the African Climate System (VASC),
- Variability of the American Monsoon System, and
- Asian – Australian Monsoon Panel.

These regional studies are carried out to improve understanding and proper representation of regional specific processes in Earth system models, and to assess the impact of global climate variability and change of these regions. These studies can now potentially serve a third purpose by evaluating the strengths and weaknesses of the regional climate information provided by projects such as CORDEX.

A major WCRP research focus is understanding the characteristics of extreme weather/climate events, with great emphasis on observations, research and modelling activities for developing near-real-time detection of such events and attribution of their causes to mitigate their impacts and to ameliorate their impacts on people, ecosystems and world economy. Some notable activities include international coordination of observations, research and modelling of; 1) meteorological and hydrological droughts and establishment of an international drought information system for sharing of available knowledge and best practices globally; 2) regional sea-level change and impacts on coastal systems and communities; and 3) expanding the development of climate/weather extreme indexes to include factors such as precipitation and temperature for use in agriculture practices and water resources management.

WCRP core projects, CLIVAR and GEWEX, initiated a number of activities focusing on droughts. An ad hoc Drought Interest Group was formed and they developed a report on “Drought Predictability and Prediction in a Changing Climate: Assessing Current Predictive Knowledge and Capabilities, User Requirements and Research Priorities”. The document (see http://www.clivar.org/organization/extremes/resources) examines current prediction capabilities and user needs with the aim of identifying areas that would benefit from international coordination. These efforts, along with the world-wide survey of user drought information needs and capabilities (available at http://www.clivar.org/organization/extremes/resources/diq) are now part of the planning for an experimental global drought information system (GDIS).

WCRP has been identified as a lead to support the development of the Research, Modeling and Prediction (RMP) pillar of the Global Framework for Climate Services. A series of consultations were held in 2008 - 2011 to define how climate research can help support and develop climate services, and an initial RMP implementation plan is prepared for consideration of the Extraordinary World Meteorological Congress to be held on 29-31 October 2012. The proposed GFCS activities will be integrated with other components of the Framework to ensure timely and effective delivery of resulting information to meet decision makers’ needs. Some proposed activities by the RMP component of GFCS include:

- Enhancing research on observations, design and development of observing networks, development and analysis of climate quality datasets; modeling and prediction capabilities, and building the required infrastructure and capacity, especially in developing and less-developed regions;

- Diversifying and expanding research with a major focus on the development of practical applications in the GFCS priority areas and strengthening validation and verification of resulting products in partnership with users communities; and
- Establishing effective partnerships necessary for science support of climate risk management and affective adaptation to climate change and variability and shortening the transition time from research to operations.

Significant progress has been made on our understanding of the climate system however in order to provide the best available state of knowledge on climate variability and change to the decision-makers it is imperative that research continue to be supported and facilitated. WCRP believes that climate research should be kept as an area of work in the future evolved structure of the NWP.