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Item 4.13 of the provisional agenda *

**SUMMARY REPORT FROM THE SECOND INTERNATIONAL CONFERENCE ON
HEALTH AND BIODIVERSITY**

Galway, Ireland, 25 to 28 February 2008

Note by the Executive Secretary

1. In decision VIII/23 on Agricultural Biodiversity, the Conference of the Parties requested the Executive Secretary to make available to Parties and relevant international organizations the outcomes of the Conference on Health and Biodiversity (COHAB) for consideration in the framework of the in-depth review of the programme of work on agricultural biodiversity at the ninth meeting of the Conference of the Parties;
2. Following this request, the Executive Secretary made the outcome of the First International Conference on Health and Biodiversity (COHAB 2005), held in Galway in 2005, available to the Parties and relevant organizations for consideration in the framework of the in-depth review of the programme of work on agricultural biodiversity.
3. The Secretariat continued its collaboration with the Cooperation on Health and Biodiversity (COHAB) Initiative, established to respond to the gaps in awareness and existing policies on issues linking biodiversity with human health and well-being, to organize the Second International Conference on Health and Biodiversity held in Galway, Ireland, from 25 to 28 February 2008.
4. The Conference focused on three interlinked themes, namely (i) disaster prevention, relief and recovery; (ii) food resources, diet and nutrition; and (iii) emerging infectious diseases. The proceedings and recommendations of the Conference will be published in the CBD Technical Series. The conference offered opportunities to COHAB partners (including the CBD Secretariat, the United Nations Development Programme, the Food and Agriculture Organization of the United Nations, the United Nations Environment Programme - World Conservation Monitoring Centre, Bioersivity International, IUCN, and the International EcoHealth Association) to further discuss ways to support the Initiative to achieve its objective of establishing an international, interdisciplinary collaborative framework to support existing activities on international development, biodiversity conservation and population health, and assist Parties in the achievement of the Millennium Development Goals (MDGs).

* UNEP/CBD/COP/9/1.

5. The Executive Secretary is pleased to circulate herewith, for the information of participants in the ninth meeting of the Conference of the Parties to the Convention on Biological Diversity, the “Summary Report from COHAB 2, the Second International Conference on Health and Biodiversity, Galway, Ireland 25 to 28 February 2008.” This summary report presents some of the key outputs of the conference discussions.

SUMMARY REPORT FROM COHAB 2, THE SECOND INTERNATIONAL CONFERENCE ON HEALTH AND BIODIVERSITY, GALWAY, IRELAND 25TH TO 28TH FEBRUARY 2008.**1. BACKGROUND:**

The programme for the First International Conference on Health and Biodiversity in 2005 recognised that there are several distinct but often inter-related issues at the heart of the relationship between health and biodiversity. Four separate workshops were held on the topics of "Nutrition, Food Security and Sustainable Livelihoods", "Natural Products and Drug Discovery", "Disease Ecology", and "Systemic Approaches to Population Health", with a plenary session on the topic of "Policy Options" for addressing health issues associated with biodiversity loss. The discussions at that conference identified some of the most important services which biodiversity provides, and highlighted the risks which biodiversity loss and ecosystem disturbance can pose to health and well-being. The conference report reiterated key messages of the Millennium Ecosystem Assessment, and stressed the fundamental importance of biodiversity to achieving the Millennium Development Goals. Following the publication of the COHAB 2005 report, its endorsement through CBD COP Decision VIII/23 (paragraph A.8), and in response to its recommendations, the COHAB Initiative (Co-operation on Health and Biodiversity) was established in 2006 to address the gaps in policy, awareness and action on the links between biodiversity and human health and well-being, and to facilitate the implementation of the Convention on Biological Diversity, the MDGs and other instruments, through the development and promotion of partnerships and transdisciplinary approaches to biodiversity conservation and the protection of human health and livelihoods. The programmes of work of the COHAB Initiative address seven key thematic areas: Livelihood Security and Freedom from Poverty; Food Resources, Diet and Nutrition; Emerging Infectious Diseases; Natural Products and Medicinal Resources; Disaster Prevention, Relief and Recovery; Indigenous Community Traditions and Health; and Climate Change Impacts and Adaptation.

After a further 18 months of capacity building and development of further partnerships between organisations in the health and biodiversity sectors, the Second International Conference on Health and Biodiversity (COHAB 2) was held from Monday 25th to Thursday 28th February 2008 in Galway, Ireland. COHAB 2 brought 170 delegates together from over 70 countries to collaborate on new approaches for protecting human health and well-being through the conservation and sustainable use of the world's biological diversity. Delegates included representatives of United Nations agencies, government ministries, NGOs, IGOs, academic institutions, the private sector, health professionals (including human, animal and plant health experts), environmental and social scientists, students, and community representatives, including indigenous community leaders, from every continent. The conference was sponsored by the Governments of Ireland, Canada, Germany, Sweden, the United Kingdom and the United States.

This summary report presents some of the key outputs of the conference discussions. The conference proceedings are due to be published as part of the CBD Technical Series during 2008. Further details of the event, and copies of the conference presentations, are available on the COHAB Initiative website at: <http://www.cohabnet.org>

Overview of conference discussions:

The conference opened with a full-day plenary session on Monday 25th February. Following a statement on behalf of United Nations Secretary General Mr. Ban Ki Moon, the event was officially opened by Environment Minister Mr. John Gormley T.D., representing the Government of Ireland, followed by representatives of the governments of Northern Ireland and the United Kingdom. These messages stressed the importance of cross-sector and cross-border co-operation for biodiversity conservation, and the need for greater international partnerships to secure the human right to health through the conservation and sustainable use of biodiversity. The importance of biodiversity to the reduction of disaster risk, particularly those risks associated with global climate change, was also emphasised. Statements were also presented on behalf of the COHAB 2 chairing organisations and

partners, including the CBD Secretariat, WHO, UNDP, FAO, UNEP-WCMC, UNESCO, the Wildlife Conservation Society, the ProAct Network, Bioversity International, and IUCN. A presentation on the findings of the 4th Assessment Report of the Intergovernmental Panel on Climate Change, and on research into human health effects of climate-related impacts on biodiversity, was also provided (by Prof. Camille Parmesan of the University of Texas).

Over the following two days (26th and 27th) the participants broke out into workshops addressing three thematic areas – **Workshop 1: Disaster Prevention, Relief and Recovery; Workshop 2: Food Resources, Diet and Nutrition; and Workshop 3: Emerging Infectious Diseases**. These three issues were identified as being of critical importance to the health and well-being human communities at the beginning of the 21st Century, and also have important links with each of the other themes under the COHAB Initiative's programmes of work. The discussions focused on experience sharing, highlighting examples where cross-sector partnerships have been used to address the linkages between health and biodiversity, and exploring successes, failures and future needs. In particular, the participants considered how the barriers between various sectors working on different sides of the health and biodiversity divide might be overcome. Related developments in international and regional policies on biodiversity, public health and the U.N. Millennium Development Goals were considered, including the outputs and impacts of the Millennium Ecosystem Assessment and recent 4th Assessment Report of the Intergovernmental Panel on Climate Change.

On Thursday 28th February, the conference met in plenary to review the outputs of the working groups, and to agree the content of the final conference report. Presentations were given by a number of COHAB partners (the United States Environmental Protection Agency, the University of Guyana, the International EcoHealth Association, Conservation International, and the Naturaleza / Itzama project), providing examples and case studies of existing collaborations between governments, research institutions, NGOs, and communities. The plenary session also included a special panel discussion on the theme of "Ecosystems, Economies and Communities in 21st Century Europe". The panel included representatives of the European Commission Directorates General for Fisheries and Maritime Affairs and for Enterprise and industry, the CBD Secretariat, UNEP-WCMC, and the UK Joint Nature Conservation Committee. The discussion covered various aspects of cross-sector and cross-border harmonisation on biodiversity conservation, and considered how the links between health and biodiversity could be factored into future European Union policy on economic and social development.

In the closing session, the future direction for COHAB, and other initiatives on health and biodiversity that were represented at the meeting, was discussed, including various options for integrating health issues into the programme of the Convention on Biological Diversity, with a view to gaining wider support across all sectors for the implementation of the Convention. The value of biodiversity and nature conservation initiatives to spiritual and psychological health, and to social cohesion, was not specifically addressed within the scope of the workshop discussions, however many participants highlighted the growing body of research and scientific evidence on these issues, and it was agreed that these aspects of health-biodiversity linkages should be explored in more detail by the COHAB Initiative programmes of work in future.

Throughout the conference, the importance of biodiversity to indigenous peoples, and the risks which biodiversity loss and associated aspects of climate change represent for indigenous communities, were recognised. The conference discussions also noted the role of indigenous communities as stewards of biodiversity, and the value of indigenous knowledge systems for food and medicine. To close the conference, regional Chief Bill Erasmus (representing the Arctic Athabaskan Council) noted the importance of the United Nations Declaration on the Rights of Indigenous Peoples, adopted by the UN General Assembly in September 2007, in addressing the issues relating to biodiversity and the health and well-being of indigenous communities. It was agreed that this should inform the COHAB Initiative's future work on indigenous community issues.

2. RECOMMENDATIONS OF THE COHAB 2 WORKSHOPS:

In preparing the programme for the conference, the COHAB Initiative Secretariat and Steering Committee recognised that there are a number of important cross-linkages between the three workshop themes. In particular, issues of cross-sector partnership (e.g. how do we identify and overcome barriers to cross-sector understanding between the health and biodiversity sectors?), the need for practical transdisciplinary action (once understanding is achieved, how should it be put into practice to effect positive change on the ground?) and climate change (recognising that climate change will impact on the status of biodiversity and human health, how can issues of impacts and adaptation inform the development of co-operation on health and biodiversity?). Therefore, to facilitate cross-linking between the three themes, in each workshop participants were asked to consider the same three cross-cutting issues in their discussions:

1. **Systemic approaches to health and development** - building, communicating and reinforcing the conceptual framework on health and biodiversity linkages.
2. **The use of strategic assessments** - ensuring that health-biodiversity relationships are appropriately considered and monitored in the design and development of plans, programmes and policies on health, social welfare and economic development.
3. **Climate change** - accounting for the potential impacts of climate change on ecosystem services in the context of each workshop theme.

The summary reports from these three workshops are presented below. Recognising that the discussions and interactions between participants were unique to each workshop, and that each workshop developed a unique format for reporting on the presentations and discussions, the reports are presented in their original formats with minimal editing of style or content.

A complete report on the conference will be published with the conference proceedings, as part of the CBD technical Series, later in 2008.

2.1 WORKING GROUP 1 REPORT – DISASTER PREVENTION, RELIEF AND RECOVERY

OVERVIEW

Early preparedness is key to all aspects of disaster prevention, relief and recovery. Yet, time and time again situations occur where interventions by humanitarian and relief agencies – though well intentioned – are carried out without due consideration of potential impacts on the environment and peoples' welfare in the longer term. Preventing negative environmental impacts from happening in the first place is of paramount importance, but rarely practiced. At best, some actions can be taken to mitigate some of the most visible impacts and eventually address possible rehabilitation of certain damaged ecosystems¹.

The status of ecosystems can have a direct bearing upon the severity of disasters. Ecosystems which are diverse and healthy are better able to cope with disasters than those which have been heavily modified through habitat conversion for tourism and other commercial purposes, or by pollution or over-exploitation. Biotic structures such as mangroves, coral reefs and sea grass beds, for example, buffer coastal settlements from the impacts of waves and storms, and help reduce erosion. Forests can likewise decrease the likelihood of flooding and prevent landslides. Sustainably managed ecosystems also support livelihoods by creating sustainable incomes and providing access to water, food, fibres, fodder, construction material and medicinal supplies that are often critical during the recovery process.

Under the banner of “**Disaster Prevention, Relief and Recovery**”, 13 formal presentations were made on the three conference themes: Building Cross-sector Understanding, Strategic Assessment, and Climate Change. Presentations focused on how disasters are being addressed by humanitarian agencies, what tools exist – including those in international treaties such as the Convention on Biological Diversity – to improve disaster prevention, relief and recovery, what efforts some countries have taken to develop well-coordinated multi-agency mechanisms for early warning system, for example, what are some of the emerging issues in relation to climate change as an additional driver of natural hazards, disasters and biodiversity² loss, and what are some key lessons learned from recent interventions.

Some links were also made with topics being addressed within the other parallel workshops, food resources and nutrition, and the emergence of infectious diseases.

Stemming from these presentations and associated break-out working groups and discussions, the following key recommendations are made.

KEY OBSERVATION I

There is compelling evidence that natural disasters can have a profound impact on ecosystem structure and functioning, and negatively affect human well-being (livelihoods, food security and health). Disaster preparedness, prevention, mitigation, response, recovery and related activities rely on biodiversity, in particular the services provided by healthy ecosystems.

Disaster relief or humanitarian assistance usually occurs immediately after a disaster has taken place. While this is indispensable in saving lives and relieving suffering in emergency situations, it often tends to place an emphasis on shelter, food and other essential assistance relative to other short- and

¹ As described in Article 2 of the Convention on Biological Diversity, "ecosystem" means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

² Biodiversity encompasses all the different species of plants and animals, microorganisms, ecosystems and all the cultivars, varieties or strains within each of these groups, as well as the diverse ecosystems of which the living organisms are part. An official definition of biodiversity is provided in Article 2 of the Convention on Biological Diversity, accessible at <http://www.cbd.int/convention/articles.shtml?a=cbd-02>.

long-term needs for sustaining both lives and livelihoods. The poorest members of communities are also disproportionately vulnerable to, and affected during and in the aftermath of, disasters.

Suggested Actions:

The following actions are needed:

- a) better prepared response activities, especially in parts of the world reputed for repeat catastrophes such as floods, cyclones and earthquakes;
- b) improved early warning systems at national and local levels to alert populations of impending risks and allow them to take appropriate avoidance actions;
- c) better informed emergency response teams that take into account environmental and livelihood issues from the outset, noting that specialist assistance might be required for such early assessments and analyses;
- d) better co-ordination between international response agencies (UN, International NGOs...) and existing national structures; and
- e) greater recognition given to lessons already learned from similar type disasters in the same country or from other parts of the world.

KEY OBSERVATION II

Increasing evidence suggests that the number, nature and scale of (at least certain types of) natural disasters is changing, with more mid- and small-sized disasters now occurring. The ongoing, cumulative and corrosive effects of small localised events on the assets – including biodiversity – and livelihoods of the poor may, in the long-term, have the same effects as natural hazards that can lead to larger disasters. It may also result in greater loss of life, high economic costs and damage, loss of livelihood, and significant – possibly lasting – damage to critical ecosystems.

The past two decades has witnessed a significant increase in the annual number of natural disasters, particularly floods, tsunamis, drought, storms, landslides, earthquakes, epidemics, and the influx of invasive species and insect infestations. In 2007 alone 399 disasters were recorded – excluding epidemics, technological disasters and insect infestations – affecting some 197 million people, with an estimated economic cost of US\$62.5 billion. This situation is expected to worsen as the impacts of global climate change become more apparent.

Suggested Actions:

The changing nature of major, recurrent types of disaster will require a rethinking of how humanitarian and relief agencies respond to emergencies. Governments, NGOs and the international community should address these kinds of risks *inter alia* by:

- a) improving co-ordination from contingency planning to emergency responses to co-ordinated action for recovery between all international and national humanitarian and relief agencies and organisations, national authorities and representatives from affected communities;
- b) identifying critical zones/areas at risk and taking appropriate preparatory actions, including the maintenance of key ecosystem functions and services;
- c) documenting the response to disasters as and when they occur;
- d) further researching the best ways to address them, at different scales and different scenarios;
- e) making funds available to help the most vulnerable communities prepare for and counter these types of risks;
- f) providing more focus and support directed towards building ecosystem and livelihood resilience at local, landscape and/or regional levels, to prevent and help buffer at least some of the worst effects of potential disasters; including building capacity and providing education and resources for communities at risk to preserve their local biodiversity; and
- g) disseminating lessons learned to all interested stakeholders so that these might be adapted and applied elsewhere, as appropriate.

KEY OBSERVATION III

Many ecosystems and their services are under increasing threat. Damage to ecosystems weakens their protective value with regard to disaster prevention and impact mitigation, as well as their provisioning value in the aftermath of disasters while recovery is taking place.

Recent studies show that many ecosystems and their services are under increasing threat. For instance, over the past 50 years, about one-third of the world's mangrove forests have been lost because of overexploitation and/or conversion to large scale development such as shrimp farms or tourism infrastructure. Deforestation, fragmentation and degradation of habitats, often exacerbated by climate change impacts, have reduced the protective function of ecosystems, especially forests and coral reefs. In addition, disaster responses have caused significant degradation of many ecosystems. For example, the inappropriate disposal of waste materials into lagoons and wetlands during an emergency response causes damages not only to ecosystems but also to the livelihoods of local communities who depend on these ecosystems for food and other primary needs. Large-scale population movement by refugees or internally displaced people can also result in serious land degradation in protracted situations, often causing knock on effects to host populations. Such movement of people, and their livestock, can also result in the introduction of invasive species and infectious diseases. Ultimately, such impacts on ecosystems may increase vulnerability and disaster risk.

Suggested Actions:

In order to maintain healthy ecosystems and optimise their role in preventing disasters, and in support of disaster relief and recovery programmes, there is a need to:

- a) compile information on, and raise awareness among humanitarian organisations about, ecosystem goods and services, and the links between ecosystem functioning (health, resistance and resilience) and their capacity to provide livelihoods, food security and healthy life in the aftermath of disasters;
- b) promote and support the integration of biodiversity into disaster strategies, building on experiences on biodiversity and essential ecosystem services accounting in disaster risk reduction, relief and recovery programmes; and
- c) urge all organisations dealing with disasters to mainstream disaster/crisis management planning and implementation into the provisions of the Convention on Biological Diversity and other multilateral biodiversity-related agreements and their programmes of work, and implement the conservation objectives of the Convention on Biological Diversity and other biodiversity-related conventions, using the ecosystem approach.

KEY OBSERVATION IV

Local and national response agencies can be overwhelmed by the international response to disasters and may not have the capacity, manpower or resources to assist with emergency response and early recovery. New environmental impacts often occur post-emergency with an increased demand for certain natural resources which can place additional stress on specific ecosystems (such as groundwater resources) and their functioning.

Suggested actions:

Emergency contingency planning and emergency response planning and actions should take into account:

- a) the capacity, needs, strengths and limitations of local and national response agencies in terms of ecosystem management and human security in light of international interventions, and standards or agreements, all of which need to be assessed;
- b) in the absence of a possible blueprint for response, prepare essential guidance on ecosystem management in a range of situations and scenarios for planners and managers to use during the initial phases of emergency response;
- c) identify gaps or likely gaps where specialist technical assistance may likely be needed;

- d) support should be planned for and provided to community-based initiatives which involve strengthening environmental resilience; and
- e) opportunity should be taken to use climate change responses as an entry point to improved and more sustainable ecosystem management, especially in situations that are likely to experience an influx of “environmentally induced displaced people” (EIDPs).

KEY OBSERVATION V

Competition over access to ecosystem goods and services can contribute to, and become a cause of, conflict, the consequences of which can negatively impact on ecosystem goods and services in both the short- and long-term. Greater recognition needs to be given to the potential positive role that conservation and ecosystem management can play in conflict prevention and resolution and peace building, while the converse also holds.

Suggested Actions:

In order to promote conservation for peace building:

- a) community-based capacity building may be required on these issues, or perhaps specific components of conflict resolution and peace building, e.g. re-inforcement of traditional systems;
- b) some rural societies have already developed capacities to cope with disasters by making use of certain ecosystem services. These efforts need to be strengthened by conservation and development organisations; and
- c) governance structures should be strengthened at all levels, bearing in mind the ecosystem approach principles.

KEY OBSERVATION VI

In the context of disaster prevention, relief and recovery, there is often a disconnect between the environmental policies, recommendations and intentions of key agencies, civil society, government authorities and donors and the need for practical actions at the field and community levels.

The situation is partly due to the fact that on the one hand, the humanitarian sector, including organisations working in the areas of crisis prevention, emergency relief, refugee aid and rehabilitation, is not sufficiently aware of the value of ecosystem services in avoiding and reacting to disasters. On the other hand the conservation community is not fully aware of the possible connections between conservation planning and disaster risk planning and management. As a result, there is often little dialogue or planning and co-ordination between the two groups, or with the affected population. Ecosystem goods and services are therefore at risk.

Related to this is also the matter that while some leading relief and humanitarian institutions might have peer reviewed policies and guidelines on different facets of environmental management, these are rarely translated into practice.

Suggested actions:

- a) Promote, enable and support greater co-operation through meaningful partnerships between leading conservation management agencies and some of the main, regular relief and humanitarian organisations, with clear delegation of certain roles and responsibilities;
- b) Lead UN agencies and conservation management organisations should re-examine the way in which existing environment-related policies and guidelines are being applied at the field level. Where these do not yet exist, vital considerations should at least be integrated into existing response mechanisms;
- c) Relief and humanitarian organisations – all levels – should be made more accountable for their (lack of) actions. There is a need to find how to get the changes for enhanced accountability

within the institutions for example by integrating accountability among criteria used by donor agencies or countries to select programmes to be funded and assess implementation;

- d) Humanitarian organisations (governments, IGOs, NGOs, CBOs) should include and emphasise within the international codes of conduct and accepted standards for humanitarian response, the need to avoid and minimise negative environmental and health impacts including by:
- early stakeholder consultations to determine needs;
 - ensuring the participation of all stakeholders and indigenous and local communities in disaster response decisions;
 - enabling, and not obstructing, access to communities in need;
 - timely, advanced identification and planning of sites for camps for displaced or returning people and/or relocation areas;
 - enabling good management of such camps and surrounding areas;
 - creating new livelihood options; and
 - restoring damaged ecosystems (goods and services) to the extent possible, post-disaster and post-conflict.
 - consideration of biodiversity and ecosystem functioning in site selection.

KEY OBSERVATION VII

Multilateral Environmental Agreements (MEAs) provide guidance on the conservation and sustainable use of biodiversity (including ecosystems) and require implementation of related programmes of work and the use of guidelines and approaches adopted by the international community to meet the conservation objectives.

In addition to the provisions³ – in the text of the Convention on Biological Diversity– aimed at ensuring the conservation and sustainable use of genetic resources, species and ecosystems for the benefit of all life on Earth, a number of tools have been developed to streamline the implementation of the objectives of the Convention. Of these, the ecosystem approach is the primary framework for implementation of any action in the Convention. Guidelines were adopted for biodiversity-inclusive environmental impact assessment and strategic environmental assessment. Programmes of work were developed and adopted with detailed guidance on how to assess the status and trends of biodiversity in different biomes, conserve and use sustainably the components of biodiversity, and find ways to enhance enabling environments to ensure success in implementation. Other biodiversity-related conventions, such as the Ramsar Convention on Wetlands of International Importance, the Convention on Migratory Species, CITES and the World Heritage Convention have similar provisions targeting specific components of biodiversity or ecosystems/habitats.

Suggested actions:

- a) encourage governments and the international community to use and improve existing tools to help communities manage risk so as to ensure that ecosystem functioning is maintained. In particular, in view of the need to take rapid decisions in many disaster relief programmes – to save lives and relieve human sufferings – there is a need to develop biodiversity-inclusive rapid environmental impact assessments of measures to be taken in the aftermath of a disaster;
- b) encourage donor countries to promote and support more of an ecosystem approach to crisis prevention and recovery;
- c) raise public awareness, in particular among decision-makers, emphasising the reliance of people on biodiversity and ecosystem goods and services following a disaster and conflict, highlighting the importance of biodiversity and ecosystem health to human health, the MDGs and international development;

³ These provisions include identification of components of biodiversity that require conservation; assessment of impacts on biodiversity of measures taken; establishment of protected areas; restoration and rehabilitation of degraded ecosystems; recovery of threatened species and genetic resources; impact assessment; sustainable use of genetic resources and ecosystems; respect and maintenance of traditional knowledge and culture; training and research; awareness raising and cooperation.

- d) humanitarian and conservation agencies, IGOs and NGOs should collaborate to compile best practices, carry out joint programme planning and implementation, and joint training/capacity building programmes;
- e) a toolkit/guide for disaster managers should be developed as well as a sourcebook containing case studies that illustrate *inter alia* how refugee support programmes can take account of ecosystems, and how – in refugee situations – issues such as the availability of food, fuel and water resources, and the risks of disease emergence, can be meaningfully addressed through an ecosystem approach;
- f) urge and train all stakeholders involved in disaster risk reduction to consider landscape-level interventions – an aspect of the ecosystem approach – to account for knock-on and downstream effects, bearing in mind the connections between and amongst ecosystems; and
- g) promote the use and application of biodiversity-inclusive environmental assessment and strategic environmental assessment tools and resources.

Key Observation VIII

Poorly planned and co-ordinated disaster responses have caused significant degradation of many ecosystems, with impacts often extending beyond the sites where response measures were applied.

Effective disaster reduction strategies begin prior to the occurrence of the disaster in order to help build disaster resilience and resistance, and continue after a disaster in order to prevent its re-occurrence or mitigate its impact. More regular use of existing tools and methodologies such as strategic assessment – a holistic approach that considers early in the planning process the projected environmental impacts in time and space of multiple actions within a landscape or ecosystem – could play an important role in improving early planning and co-ordination, as well as subsequent implementation and monitoring.

The purpose of a strategic assessment of the biodiversity component of a disaster or potential disaster is to ensure that biodiversity-human well-being relationships are appropriately integrated in the design and implementation of plans, programmes and policies. Strategic assessment can thus lead to disaster risk reduction strategies that involve addressing both natural hazards and people's vulnerability to them. This has important social, economic and environmental implications as disaster prevention is usually less costly and more effective than coping with a disaster after its occurrence. Strategic environmental assessment also provides an opportunity for cross-sectoral collaboration.

Suggested actions:

There is a need to:

- a) define the roles and responsibilities of relevant sectors in maintaining ecosystem integrity in high-risk areas and during the management of disasters;
- b) integrate in disaster prevention, relief and recovery, ecosystem-based response strategies in which ecosystem functions are protected or restored at the appropriate spatial (e.g. landscape) and temporal (integrating quick responses and long-term strategies) scales and minimum environmental standards in recovery plans as well as environmental contingencies are included;
- c) in the context of disasters, such as those caused by drought, that do not happen suddenly but give some warnings, monitor these warnings and take them into account early enough so as to identify ways to prevent the disaster from happening, or set in place preparedness measures to mitigate their impacts.
- d) take into account the cumulative, corrosive effects of small localised events and the warnings from some types of disasters such as droughts;
- e) facilitate co-operation between sectors and promote enforcement and monitoring; and
- f) ensure participation of indigenous and local communities in strategic assessments.

Key Observation IX

While awareness is steadily building of some of the looming threats likely to take place as a result of the Earth's changing climate, the potential scale and diversity of impact of this is still not appreciated. Some risks are almost certain to be exacerbated under climate change. Are we prepared to deal with these?

It has been estimated that 75 per cent of disasters are triggered by weather related events, and that the frequency of such events will increase as the result of climate change. Climate change is predicted, with high certainty, to increase the severity of natural events such as floods, landslides, droughts, heat waves and storms. This is likely to only enhance the vulnerabilities of certain communities, and increase the risks of disasters associated with extreme weather events. Healthy ecosystems have been showed to play a part in adaptation to climate change. Their protective role is likely to become increasingly important as the impact of climate change is expected/predicted to continue to increase. The number of people being displaced by climate-related events is already increasing.

Suggested actions:

- a) raise awareness among development, planning, disaster and humanitarian agencies and organisations, with specific inference as to what will/may happen in terms of environmental and livelihood impact;
- b) document good practices in integrating climate change and biodiversity considerations into disaster strategies. Disaster prevention efforts that depend on particular characteristics of local ecosystems, for example, should seek to understand and take into account how the protective capacities of ecosystems are likely to change in the future;
- c) future response to weather-related disasters should consider not only current environmental conditions, but also how climate is likely to change and affect the frequency of similar disasters over the next few decades, taking into account indigenous and local communities. This will make efforts to rebuild communities more robust in the long-term;
- d) better understand the importance of “wild foods” in the context of them being a critical component to many peoples’ coping strategies, post-disaster or conflict. Many of these foods are less well known, less understood and less acknowledged;
- e) more attention needs to be given to an already quite well developed set of soft-engineering skills to prevent and/or reduce the scale and impact of certain disasters, many of which can be based around ecosystem management and resilience;
- f) long-term monitoring of biodiversity is necessary to enable the prediction and development of strategies to support human well being and health;
- g) governments and IGOs and NGOs should start planning for future “climate change induced human displacement” situations through ecosystem planning and management; and
- h) government agencies, NGOs, IGOs and CBOs dealing with humanitarian programmes should be urged to take into consideration and implement the provisions on climate change in MEAs. Biodiversity conservation, when compared to other protection methods, is a relatively inexpensive and effective method of protecting human life, livelihoods and infrastructures from disasters. In addition conservation of ecosystem goods and services can have synergistic positive impacts on food supply, human health, provision of clean water and livelihood options.

Postscript:

Under the theme of “Emergency Relief, Aid and Response”, Decision VIII/27 of the Convention on Biological Diversity Conference of the Parties (8) noted the following which is of relevance to many of the issues raised above, in particular invasive species.

40. *Encourages* relevant international bodies and organisations to develop international codes of practice for preventing and minimising potential spread of invasive alien species on equipment, supplies and vehicles associated with emergency relief, aid and response efforts, and to develop procedures for ensuring that assessments to determine aid requirements include identification of any issues of invasive alien species;

41. *Encourages* the United Nations Office for the Coordination of Humanitarian Affairs, the World Food Programme and other relevant bodies to develop codes of practice or guidelines such as the IUCN Guidelines for Restoration of Tsunami-affected Areas for dealing with cases where invasive alien species are dispersed following a natural disaster or event;

42. *Urges* Governments and other donors to take measures to prevent and minimise the introduction and spread of invasive alien species as part of their emergency relief, aid and any response efforts, and to take into account any relevant codes of practice or guidelines that may be developed at international level, or national legislation as appropriate, in their national aid operations or in the operations of non-governmental organisations within their country.

2.2 WORKING GROUP 2 REPORT – FOOD RESOURCES, DIET AND NUTRITION

OVERVIEW

Agricultural biodiversity includes the entire variety of living things associated with agriculture, including the plant and animal species used for food, and the other organisms, habitats and ecosystems which support food production. The Millennium Ecosystem Assessment has outlined the important functions of biodiversity, which, through the provision of ecosystem goods and services, support all human life and our development, including the provision and safeguarding of vital food resources. In addition, detailed research (such as the work of the U.N. Food and Agriculture Organisation, the Consultative Group on International Agricultural Research and others) has clearly established that food production systems that conserve and encourage biodiversity often produce higher yields, and support crops which are naturally more resistant to climatic extremes and diseases than strict monocultures in intensively farmed landscapes. In some areas, food resources based on native species and wild food types, also have higher nutritional value, are more robust, and are more important to people's livelihoods and well-being, than non-indigenous foods. Utilising and enhancing biodiversity, particularly in the improvement of native breeds, can have significant benefits for local economies and rural livelihoods. Agricultural biodiversity is likely to become increasingly important for food security as the effects of climate change become more pronounced and widespread. Climate change presents particular threats to food production systems and to animal and plant health, through impacts on weather patterns, soil quality, pollinators, the availability of clean water, and the occurrence and distribution of pest species and infectious diseases. Enhancing the diversity of food crops, and ensuring the success of measures to conserve unmanaged agricultural biodiversity, can not only provide real economic and social benefits in the short term, but can also help the agricultural sector adapt to climate change and protect crop and livestock health in the longer term.

The report from the first COHAB conference in 2005 (see CBD COP decision VIII/23) states:

“In devising and implementing national development strategies and agriculture policies, governments should ensure that the genetic and species diversity of agricultural produce is preserved and improved, that the ecosystems which support food production are conserved, and that the importance of dietary diversity based on crop and livestock varieties is explained and promoted to producers and consumers.”

Nutritional health, security and sustainable food production systems depend upon healthy, biodiversity-based ecosystems. COHAB 2 partners support the increased production and consumption of ‘good food’ which is nutritious and culturally appropriate. ‘Good food’ is defined by local cultures and the resources available in local ecosystems.

The workshop on Food resources, diet and Nutrition included fourteen presentations and discussions focussed on the three COHAB cross-cutting themes of “building cross-sector understanding”, “strategic assessments”, and “climate change”.

These recommendations are made against a background of continuing human population growth, decline in ecosystems, loss of biodiversity at all levels and increasing risks to human health and wellbeing. Climate change will lead to changes in the large scale food production systems that feed the bulk of the world's population living in urban settings. The price of starchy staples and edible oils is expected to increase as a result of climate change and growing demand for use of bio-fuels. Population growth is expected to increase pressure on water supplies and demand for land and food and the productivity of agricultural systems will decline if current rates of ecosystem decline continue.

Against this background, the biodiversity found in many diverse small scale agro-ecosystems is an important source of genes and species that can help diversify the biodiversity base of food production and enhance resilience to environmental change.

The COHAB 2 conference emphasises the fact that diversity of species, habitats and ecosystems translates into improved nutrition and dietary diversity. In recognising this fact and in working towards the conservation and sustainable use of biodiversity for enhancing food and nutritional security, deliberate efforts need to be made to:

1. Work towards expanding, maintaining and sustaining biodiversity at ecosystem level in an integrated and holistic manner involving all relevant sectors.
2. Conserve biodiversity and ecosystems as the basis for varied food crops and healthy diets, including traditional diets and those with cultural significance.
3. Conserve biodiversity and ecosystems as the basis for essential ecosystem services supporting a productive agricultural sector, including pollination.
4. Recognise and respect the cultural importance of local foods, and that what constitutes 'good' food varies depending on local biodiversity and culture.
5. Strengthen protection of agrobiodiverse ecosystems as essential sources of plant and animal genetic diversity and food security, particularly in conferring resilience to effects of rapid environmental change. Promote community management and livelihood security for people living in protected areas with traditional agricultural practices
6. Ensure that local, regional and international responses to food crises recognise the fundamental importance of biodiversity and ecosystems to human health and well-being, and ensure that responses do not unnecessarily affect critical ecosystem functions required by local communities.

BUILDING CROSS-SECTOR UNDERSTANDING

The COHAB Initiative provides a platform for policymakers, researchers, development partners and local communities to collaborate in building cross-sectoral understanding. The following recommendations are made to enhance understanding of how biodiversity can contribute most effectively and directly to improve food security and nutrition for human health.

1. Develop partnerships to systematically and centrally compile and widely disseminate information on the role of biodiversity in food and health and to provide examples of functional ecosystems that influence nutritious dietary diversity.
2. Ensure that the responses to issues of food and nutrition security, including local or regional food shortages or wider international food crises, recognise the importance of biodiversity to the sustainability of ecosystem goods and services, such as those that support food production, health and livelihoods, and avoid actions that could negatively affect biodiversity,
3. Establish partnerships at all levels to include and work with:
 - policy makers in relevant sectors (health, agriculture, finance, environment, development...);
 - local communities and indigenous and traditional societies that are stewards of biodiversity and depend upon it for food, nutrition and cultural identity;
 - practitioners in biodiversity conservation, health, nutrition and development;
 - practitioners in impact and risk assessment and for integration of biodiversity in policies, programmes and projects.
4. Apply Impact Assessments / Strategic Environmental Assessments more widely and consistently as a tool for integrated assessment of agricultural and food policies and plans with implications for biodiversity and health. Furthermore, it is important that assessments of other policies and plans, e.g. for infrastructure development, development co-operation, energy development etc, recognise the ecosystem services provided by managed and unmanaged agricultural biodiversity. These assessments should consider biodiversity-based food and income security as key issues related to health and wellbeing.

STRATEGIC ASSESSMENT

A wide range of tools have been developed for assessing the likely impacts of plans, programmes or policies on environmental, social and economic factors. The tools of Strategic Environmental

Assessment, cost benefit analysis, and health impact assessments are particularly well developed, and in many countries they are now being utilised for assessing the wider impacts of agricultural policies. However, there is a continuing need to ensure that the importance of ecosystem services and the role of biodiversity (agricultural and otherwise) in maintaining ecosystem function, is recognised within these tools. To facilitate this, it is important that information on the health and social aspects of agricultural biodiversity, including community and indigenous knowledge, case studies and scientific data, is documented and made available to decision makers.

1. Document and map local dietary diversity as influenced by ecosystems and disseminate this information to influence nutritional behaviour in both rural and urban areas. Disaggregate global or national-level data to ensure that people from different cultures can see their own needs and traditions reflected in the data.
2. Provide a range of examples from diverse ecosystems that provide nutritious foods and dietary diversity through sustainable use of biodiversity. Identify the specific areas and cultures where biodiversity contributes to nutritional security by linking healthy food systems with healthy ecosystems. Ecological modelling and spatial mapping of suitability of different ecosystems for foods that could be locally produced to meet both rural and urban demand is urgently needed.
3. Identify common goals / indicators for environmental, food security, poverty, health and nutrition assessments.
4. Provide evidence of the benefit (including socio-economic) of biodiversity to the poor when faced with identified nutritional deficiencies and hunger or in times of disaster or environmental stress.
5. Explore the value of home and community gardens
6. Encourage the exploration of alternative food production systems utilising and enhancing local biodiversity and ecosystem services, such as forest
7. Develop and implement rapid biodiversity-inclusive environmental assessment tools should be developed and utilised as a key element in the development and implementation of responses to food emergencies.

CLIMATE CHANGE: EFFECTS AND RECOMMENDATIONS

The COHAB 2 conference recognises that distributions and abundance of biodiversity are likely to change as a result of climate change, with possible adverse consequences in terms of food and nutritional security. Impacts are already being felt in Polar Regions, high mountain areas, margins of desert areas, island states and coastal zones. There is evidence of *inter alia* changes in migratory patterns, declines in fisheries, retreat of forests, all of which can reduce access to food resources at critical periods, leading to periodic food shortages and declines in dietary diversity and quality, and impacting upon traditional food systems and cultural associations, such as seasonal abundance or harvesting of food species.

Hunter-gatherer and artisanal fishing communities depend directly on biodiversity for their food. Declining abundance of wildlife, restricted access to land and forced resettlement or migration are undermining traditional values and lifestyles and increasing food insecurity and malnutrition.

Population growth, poverty, lack of infrastructure and lack of access to markets with good quality affordable foods make the conservation and sustainable use of biodiversity an essential element of strategies for ensuring food security, good nutrition and health for much of the world's population.

Protecting biodiversity in intact ecosystems ('wild' biodiversity) and in diverse, traditional farming systems provides insurance against possible future impacts of climate change and is a critical component of strategies to safeguard the food system and global food security in the face of climate change.

Actions that can be taken to safeguard this critical role include:

1. Promoting awareness of the nutritional value of under-utilised wild or traditional foods with high nutritional value and their sustainable use.
2. Recognising the role of biodiversity in protecting food security as an important environmental service. This role should be acknowledged and included in environmental service payment schemes, and incorporated into climate change adaptation strategies.
3. Strengthening protection mechanisms for agrobiodiverse areas and food systems (including traditional farming or hunter-gatherer cultures) to conserve the genetic base for adaptation and resilience to environmental change.
4. Encouraging diversification of farming systems and the protection of biodiversity as a source of the genetic diversity needed to strengthen resilience in the face of climate change.

WHAT THE COHAB INITIATIVE CAN PROVIDE

COHAB promotes an integrated perspective on health, biodiversity and the relationships between them. Its unique coalition of partners means that COHAB 2 is able to provide:

1. Model cases from different ecosystems showing the potential contribution of biodiversity and demonstrating the role of indigenous, local and traditional foods in nutrition, food security and in sustaining cultures and livelihoods.
 - African traditional vegetables
 - Aquatic biodiversity in rice production systems in Asia
 - *Coastal; marine ecosystems with diverse foods*
 - *Animal production and agroforestry in dryland*
 - *Marine food systems and migratory species (early warning systems)*
 - *Forest foods and sustainable forest management*
2. Messages for policy makers demonstrating the need for cross-sectoral approaches.
3. Identification of common goals derived from environmental, food security, health and nutrition assessments.
4. Messages for practitioners in conservation, nutrition and development including the need for further development of tools for integration of biodiversity in programmes and projects.
5. A participatory approach based on partnership at all levels, including representatives from local communities and indigenous and traditional societies that are stewards of biodiversity and depend upon it for food, nutrition and cultural identity.

NEXT STEPS

To maximise the potential for developing traditional and local foods for larger markets, the following key issues must be addressed:

- Lack of information on the food composition and quality of traditional and local foods from biodiversity.
- Lack of information on potentially toxic components as well as contaminants required to support risk assessments for food safety.
- Lack of information on sustainable harvests/ population viability as the basis for sustainable production.
- Epidemiological and nutritional evidence that traditional and diverse diets and foods provide better health outcomes.
- Social and economic evidence that use of biodiversity that is locally available and culturally appropriate can support the effectiveness of nutritional strategies.
- The need to research and identify adaptive strategies for responding to effects of climate change on biodiversity and on the distribution, abundance and availability of traditional and local food.
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Further cases and examples are required to demonstrate how:

1. The rural poor and peri-urban poor that depend directly on biodiversity can offer lessons and on how to improve the nutritional quality and dietary diversity of the food system globally.
2. Biodiversity and dietary diversity in local ecosystems can provide sources of new products and foods that can enter food markets, reversing the global trend towards more refined and less nutritious foods and over reliance on energy rich and nutrient poor diets that are a major factor in the alarming increase in chronic diseases seen worldwide in rich and poor populations alike.
3. Small scale farming systems rich in biodiversity can be sustainable and economically viable options to address rural hunger and malnutrition.
4. The role of biodiversity, health and the links between them in livelihood security, and poverty reduction strategies.
5. The link between healthy food and sustainable production and protected area management can be strengthened to improve the management of protected areas as well as increase their value to food security and development.

2.3 WORKING GROUP 3 REPORT – EMERGING INFECTIOUS DISEASES

OVERVIEW

The COHAB2 conference has brought together individuals spanning a wide range of experience and competence, from over 70 countries representing Africa, Asia and the Middle East, North America and the Arctic, Latin America, Australia and the Pacific region, and Europe. Participating agencies include community practitioners, leading scientists, non-governmental organizations, intergovernmental organizations, and United Nations organizations.

A failure to address the root causes of disease emergence and spread associated with ecosystem change or impacts on wildlife could have severe global consequences. Therefore, it is essential that the use of biodiversity indicators and the protection of ecosystems be integrated into international efforts to protect public health and prevent the emergence and spread of infectious diseases. This workshop aims to facilitate a greater awareness and understanding of the links between human health, ecosystem health and wildlife health, and to assist the development and implementation of an ecosystem approach to policies and programmes aimed at preventing the emergence of infectious diseases.

The participants of the COHAB2 conference agree that:

- Biodiversity underpins the stability of ecosystems, and the services that they supply to people; these services are the ultimate determinants of human health.
- The protection of human health is a common value across cultures and societies. The loss of biodiversity on earth poses a severe risk to human health and well-being, and thus is of concern to all people on earth.
- Decision-makers at all levels are called upon to recognize the scale of biodiversity loss, and the risks that this poses to human health and society.

KEY OBSERVATION I

Human interactions with the natural environment are closely linked with the emergence of infectious diseases. Twenty-six percent of deaths are caused by infectious diseases globally (World Health Report, 2004). Over 60 percent of infections are zoonoses (infections transmissible between animals and humans), and over 70 percent of these zoonoses arise from interactions with wildlife.

Biodiversity loss is proceeding at a rate that is unparalleled in human history. Estimates of the current rate of biodiversity loss are several orders of magnitude higher than those for the pre-industrial era. This loss is both the direct and indirect result of human actions such as deforestation, monoculture, exploitation of wildlife for bushmeat and trade, habitat degradation, pollution and release of toxic chemicals into the environment, and climate change. There are many ways in which this rapid loss of biodiversity can lead to emerging infectious diseases; for example by bringing humans, reservoirs and pathogens into closer contact, by mixing domestic and wildlife species resulting in transmission of pathogens to novel hosts, by increasing the abundance of a few highly efficient vector or pathogen species via loss of ecosystem balance, and by imposing stress on natural ecosystems that may result in immunocompromise of its constituents.

KEY OBSERVATION II

A greater understanding of the role of biodiversity or biodiversity loss, and of ecosystem disruption, in the emergence of infectious diseases is of critical importance, so that the

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appropriate preventative measures can be taken. This will require support for large scale, interdisciplinary research.

The relationship between biodiversity and emerging infectious diseases lies in the nature of human-ecosystem interactions, with variation in direction, magnitude, and complexity. Areas of concern include:

Species Richness: Preliminary studies show that loss of species richness may augment vector born diseases by removing alternate hosts from the system, thus increasing transmission and amplification of the pathogen. Examples of this early research include influences of environmental change on vectors of schistosomiasis and Lyme disease.

Habitat Infringement: Evidence has also shown that through human infringement into forested areas, we are decreasing the natural boundaries that protect humans from exposure to new diseases. Ebola outbreaks in central Africa due to bushmeat hunting and emergence of lyssa virus carrying bats from forests that have been burned for clearance are examples. Likewise, introduction of alien species into new ecosystems, including domestic species and humans, often results in novel disease transmission to vulnerable wildlife species. Examples include introduction of measles and polio into endangered gorilla populations in central Africa, and introduction of bovine tuberculosis into lion, buffalo and other key wildlife species across southern Africa due to the introduction of cattle from Europe. The emergence of these introduced diseases into wildlife can then in turn provide further risk to human health via direct transmission to humans, or back to livestock, making it difficult to eradicate the disease in domestic populations (decreasing livestock productivity, food security and safety). Bovine tuberculosis has shown to account for over 28.6 percent of diagnosed extra-pulmonary tuberculosis in humans in Tanzania (Kazwala et al., 2006). Likewise, H5N1 highly pathogenic avian influenza emerged as a result of a wild bird low pathogenic strain infecting domestic chickens, in which it mutated to the highly pathogenic form that is deadly to many wild birds, domestic poultry and humans.

Wildlife Trade: The trade of wildlife has led to unnatural mixing of wildlife species with each other and with domestic animals leading to or promoting spread of emerging diseases such as SARS, highly pathogenic avian influenza, and monkeypox. More than 136,000 live mammals, 243,000 live birds, 5.9 million live reptiles and amphibians, and 222 million live tropical fish are estimated to be traded globally every year (United States Fish and Wildlife Service). Furthermore the illegal importation of bushmeat products from high risk areas into major airport hubs is a growing concern for emergence of new diseases into developed countries.

Agricultural Practices: These issues are also of concern in plant agriculture where a move toward monoculture crops increase risk of plant pathogen epidemics. Intermixing of maize into vegetable crops in Africa has led to fusarium fungal contamination of vegetable crops, resulting in systemic infections of immunosuppressed and immunocompromised individuals such as HIV/AIDS sufferers. Furthermore, it has been shown that the cultivation of native grasslands of Argentina and Venezuela into cropland has favored rodents carrying the natural reservoirs of viruses causing hemorrhagic fever (Mills Biodiversity Journal 9-17, 2006).

More research is needed to adequately explore and define the extent of these human-biodiversity-disease interactions.

KEY OBSERVATION III

The combination of preliminary evidence and potentially severe consequences calls for a precautionary approach to manage biodiversity loss, and to prepare for possible large scale effects on disease emergence.

Failure to manage interactions with natural ecosystems thus far is at the origin of the emergence of diseases such as HIV/AIDS, SARS, and highly pathogenic avian influenza, among many others.

Rapidly emerging infectious diseases have had severe human and economic consequences. For example, the SARS epidemic resulted in a loss of over \$30 billion dollars, and the costs of emergence of highly pathogenic H5N1 avian influenza has cost over \$620 billion dollars globally. The World Bank has estimated a severe pandemic could cost the global economy up to about 4.8 percent of world gross domestic product - around \$2 trillion of a world GDP of \$40 trillion.

Even in the absence of further research, there is much that can already be recommended based on current knowledge.

KEY OBSERVATION IV

Other benefits of an interdisciplinary approach to emerging infectious disease prevention and biodiversity conservation include health promotion, cost-effectiveness, and impact sensitivity.

Some examples of these benefits include:

Animals as indicators of human health: Wildlife can serve as indicators of human health; as they are entirely dependant on the environments around them, they often show evidence of environmental stress early. Examples include reproductive evidence of chlorinated pesticides in raptors, bacterial and parasitic diseases in domestic animals and wildlife sharing water sources with people, and using disease presence or prevalence in wildlife as an early indicator of disease presence or potential prevalence in humans such as Lyme disease, plague, West Nile virus, or yellow fever.

Interdisciplinary approaches as economic strategies: There are examples of interdisciplinary projects that have conserved costs associated with biodiversity conservation and disease prevention. Examples include pooling resources to purchase vaccine related medical supplies, creating public outreach information on zoonotic disease risks such as bushmeat consumption, pooling funds and efforts toward family planning strategies in poverty stricken populations bordering conservation areas, improving livestock health which in turn benefits human health and livelihoods as well as decreases risk of disease transmission to and from wildlife, sharing research data and isolated pathogens, and unifying early warning and outbreak response efforts. Furthermore, costs associated with disease outbreak response, and recovery from unsustainable agricultural use plans that did not take biodiversity and disease impact assessments into account, often are more expensive than sustainable natural resource management plans that could be developed via an interdisciplinary approach.

KEY OBSERVATION V

A stronger linkage between surveillance systems for wildlife, domestic and human health is needed. This can provide earlier detection of emerging infectious disease, preventing loss of life and economic impacts, and can serve multiple functions- such as detecting hazardous chemical pollutant or bioterrorism events.

Disease monitoring databases and limited disease risk models exist in the human, domestic animal, and wildlife realms. These databases and models must be integrated, along with existing landscape ecology and climate change information, and applied to the risk of emergence of infectious disease, to predict risk in space and in time. These systems have the potential to improve targeted surveillance effort, lengthen warning times, and increase the cost-effectiveness of disease surveillance.

Support must be increased to allow non-governmental organizations, universities, and researchers to further investigate and monitor emerging diseases in humans, domestic animals and wildlife and to further define the effects of human-ecosystem interactions on disease emergence and spread.

KEY OBSERVATION VI

Climate changes due to global warming are having effects on biodiversity that are likely to result in a significant increase in disease emergence.

As the direct effects of climate change such as temperature rise and alterations in precipitation continue, incidences of diarrhoeal diseases, certain vector borne diseases such as malaria, and malnutrition and dehydration are expected to increase substantially. Of additional concern, it has been estimated that over 50% of 1500 wild species analyzed across the planet have shown a significant response to global warming, including advancement of tropical species into more temperate zones (Parmesan & Yohe 2003). It has also been shown that the global distribution of key human pathogens follows the same latitudinal diversity gradient as most animal species (Guernier et al., 2004). Thus advancement of historically tropical microbial species into temperate zones is expected. Areas of research include the increased prevalence and duration of cholera causing bacteria in oysters in the gulf of Mexico during warmer water temperatures (Shapiro et al. 1998), the increased global range of dengue carrying mosquitoes from 35% to 50-60%, by 2085 (Hales et al, Lancet 2002), and hantavirus carrying mice in Europe. Therefore, climate changes and changes in disease dynamics in wild animals have strong implications for human health.

RECOMMENDATIONS

- Encourage combined disease surveillance systems for wildlife, domestic and human health via funding for research to allow data and modelling systems, including those monitoring ecosystem degradation and climate change effects, to communicate to improve multidisciplinary understanding of causal relationships.
- Review and make greater use of impact assessment approaches for strategic and project decisions that may affect biodiversity, wildlife and human disease risk.
- Recommend an interdisciplinary approach be integrated into all disease prevention and response programs, and biodiversity conservation efforts, where reasonable, including non-governmental organizations, United Nations organizations, businesses, governments, and regulatory agencies.
- Call for public health professionals to recognize the importance of biodiversity and climate change to disease regulation, and to take a more active role in the protection of biodiversity and the ecosystem services that it provides, as critical environmental determinants of human health.
- Call for the integration of the concepts of biodiversity and ecosystem health more widely into veterinary, human, ecological, social, political, and biological curricula, in order to raise the interdisciplinary understanding necessary to engage this complex set of issues.

COHAB 2 RECOMMENDATIONS ON COLLABORATION WITH THE SECRETARIAT OF THE CONVENTION ON BIOLOGICAL DIVERSITY:

The participants in the COHAB 2 meeting recognised:

1. that the continuing loss of biodiversity, from local to global scales, threatens the health and well-being of all peoples worldwide,
2. that social, religious, moral, ethical and also economic arguments for biodiversity conservation have, in general, failed to capture the attention and commitment of decision makers and the general public,
3. that the issue of human health, including physical health and freedom from illness, psychological and spiritual health, social cohesion, and related aspects of livelihood security and sustainability, provide a compelling argument for biodiversity conservation, and represent a critically important point of entry for biodiversity into national economic and social planning and related decision making processes.
4. that there is a pressing need for the development and implementation of transdisciplinary approaches to health protection and biodiversity conservation, recognising the systemic relationships between biodiversity, human activities and the sustainability of ecosystem goods and services,
5. that the issue of health and well-being has direct relevance to each of the thematic programmes of work of the Convention on Biological Diversity, and that this provides

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important opportunities for engaging non-environment sectors to support the implementation of the convention.

A principle aim of the COHAB Initiative is to support the implementation of the CBD through the development of cross-sector partnerships on biodiversity conservation for human health and well-being. During the conference, a number of opportunities for partnerships with the CBD Secretariat, SBSTTA and National Focal Points were identified. These have been incorporated into the COHAB Initiative Strategic Plan as follows:

The COHAB Initiative Secretariat and partner organisations should seek to:

- Collaborate with the CBD Secretariat and SBSTTA to conduct a review of the existing CBD implementation framework, in order to identify opportunities for highlighting and addressing health and development issues within existing programmes, and addressing links with health aspects of the Millennium Development Goals, with a view to highlighting areas for mainstreaming biodiversity and the CBD into the development / development aid sectors.
- Collaborate with the Secretariat of the CBD and SBSTTA to identify avenues for inclusion of health and development issues within existing national programmes of implementation of the CBD. The COHAB Secretariat should communicate with national focal points to the CBD, to invite their participation and input to the COHAB Initiative, and building on opportunities to engage with other sectors and organisations.
- Collaborate with the CBD Secretariat, WHO and other partners to prepare a series of case studies to highlight the links between biodiversity and human health and development. These case studies should cover each of the COHAB thematic programmes. and involve local communities in a number of developing and developed countries. As far as is possible these case studies should connect with existing projects in related areas, e.g. on climate change and the MDGs.
- Collaborate with the CBD Secretariat, WHO, other COHAB partners, particularly within the development aid sector, to develop an international project to assess the links between ecosystem health, human health and animal health in areas affected by disasters. This project should promote the use of existing tools to identify critical ecosystem goods and services within areas considered at risk from natural disasters, including those exacerbated by climate change; and in particular should seek to develop guidance for rapid biodiversity-inclusive environmental assessment tools for use in crisis management situations.
- Collaborate with the CBD Secretariat, the International Association for Impact Assessment, WHO and other partners to explore the use of strategic assessment as a tool to assist local and national government agencies to explore the relevance of biodiversity to key health and development issues in their respective areas of influence or activity; and to assist with the development of methods for biodiversity-inclusive health impact assessment.
- Collaborate with the CBD Secretariat, the World Resources Institute, the World Business Council for Sustainable Development, and other partners, to further develop existing tools for identifying risks and opportunities associated with biodiversity for the private sector, focusing particularly upon companies involved in delivering healthcare (including manufacturers of pharmaceuticals and personal care products, private hospitals and health consultancies, Research & Development laboratories, health insurers etc).

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