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REGIONAL WORKSHOP ON THE INTERLINKAGES
BETWEEN HUMAN HEALTH AND BIODIVERSITY
FOR AFRICA
Maputo, Mozambique, 2-5 April 2013

REPORT OF THE REGIONAL WORKSHOP ON THE INTERLINKAGES BETWEEN HUMAN HEALTH AND BIODIVERSITY FOR AFRICA

I. BACKGROUND/INTRODUCTION

1. The Conference of the Parties to the Convention on Biological Diversity (CBD) has requested the Executive Secretary of the Convention on Biological Diversity to further strengthen collaboration with the World Health Organization (WHO), as well as other relevant organizations and initiatives, to promote the mainstreaming of biodiversity issues in health programmes and plans and to investigate how implementation of the Strategic Plan for Biodiversity 2011-2020 can best support efforts to address global health issues, including avenues for bridging gaps between work on the impacts of climate change on public health and the impacts of climate change on biodiversity (decision X/20, paragraph 17).

2. Accordingly, the CBD Secretariat, with the generous financial contribution from the Government of Japan and in collaboration with the World Health Organization (WHO), is co-convening a series of regional workshops to address issues relevant to biodiversity and human health. The workshop for the African region was co-hosted by the Convention on Biological Diversity, the World Health Organization Headquarters and the World Health Organization Regional Office for Africa (WHO/AFRO), with support of the Oswaldo Cruz Foundation (FIOCRUZ), in Maputo, Mozambique, from Tuesday 2 April to Friday 5 April 2013 including a half-day field trip on Friday 5 April 2013. The workshop was facilitated by Mr. David Cooper and Mr. Carlos Corvalán.

3. The workshop was attended by government-nominated officials representing ministries of health, as well as representatives nominated by the CBD national Focal Points from: Angola, Botswana, Burkina Faso, Burundi, Cape Verde, Comoros, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Guinea, Guinea Bissau, Kenya, the Kingdom of Lesotho, Madagascar, Malawi, Mozambique, Sao Tome and Principe; Senegal, Republic of Seychelles, the Republic of South Africa, Swaziland, Uganda, Zambia and Zimbabwe. Additionally, a representative from an indigenous and local community specializing in the area of traditional medicine attended. Various resource persons from the region contributed their expertise in mainstreaming biodiversity, local implementation, stakeholders' engagement, work with other Conventions, and specializing in key issues related to biodiversity and human health including zoonotic and infectious diseases, water and food systems, gender and traditional medicine. The list of participants for the workshop can be accessed at http://www.cbd.int/getattachment/health/africa/maputo-workshop-participants-en.pdf.[1]

[1] All countries in the WHO African Region were invited to nominate experts through notification SCBD/STTM/DC/CRm/81133 as well as an invitation letter distributed to WHO focal points through the WHO regional office. Given that funding was limited,

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4. The general objective of the workshop was to contribute to the implementation of the Convention on the Biological Diversity and the Strategic Plan for Biodiversity 2011-2020 in the WHO African Region, by providing a forum to national health and environment/biodiversity experts from African Parties to the CBD on actions to be taken in their respective countries while also advancing the objectives set out in the Libreville Declaration on Health and Environment in Africa (Libreville Declaration).

5. The specific objectives of the workshop were to:

(a) Acquaint all participants with the CBD and its implementation frameworks including the Strategic Plan for Biodiversity 2011 - 2020, in particular as they relate to health issues;

(b) Facilitate national implementation of the Strategic Plan for Biodiversity 2011-2020, including by assisting Parties to develop national biodiversity targets in the framework of the Aichi Biodiversity Targets;

(c) Raise awareness to stimulate early actions to implement the Strategic Plan for Biodiversity and the Libreville Declaration;

(d) Assist Parties in understanding the linkages between biodiversity and human health with a view to reviewing, updating, revising and implementing NBSAPs, with consideration given to how they can serve as an effective tool for mainstreaming biodiversity and human health into broader national policies;

(e) Facilitate active learning opportunities and peer-to-peer exchanges for National Focal Points and persons in charge of implementing and revising NBSAPs, national health strategies and the Libreville Declaration;

(f) Discuss actions to be taken by national authorities in order to ensure mainstreaming of biodiversity and health linkages in the national development plans, especially within the national plans of joint actions (NPJAs) for implementation of the Libreville Declaration;

(g) Integrate the values of biodiversity into relevant national health policies, programmes and planning processes.

(h) Agree on essential actions to be undertaken in order to strengthen national capacities for a sound implementation of the CBD in the health sector.

priority was given to those who responded early and to those countries that nominated experts from both sectors. Specialized experts working in the region were also recruited through a tendering process.

6. The workshop format featured a mix of presentations with questions and answer sessions, discussions in small working groups, interactive sessions and a field study visit. Plenary sessions of the workshop were held in English, French and Portuguese with simultaneous translation. At the beginning of each day, two participants were asked to make a summary of the main points of the previous day.

7. This report provides an overview of the workshop agenda sessions, discussions, the conclusions of the meeting, and the next steps going forward. Annexes to this report present more detailed information about the workshop, including the resulting workshop conclusions (annex I). The full workshop programme is presented in Appendix I.

II. SUMMARY OF PROCEEDINGS

ITEM 1. OPENING OF THE WORKSHOP

8. The workshop opened on Tuesday, 2 April 2013. During the opening ceremony, Mr. David Cooper, Director of the scientific, technical and technological matters division at the CBD Secretariat welcomed over 60 participants from ministries of health, ministries of environment and other experts. He also delivered a statement on behalf of the Executive Secretary and introduced representatives of FIOCRUZ, WHO/AFRO and from the Ministry for Coordination of Environmental Affairs of Mozambique.

9. On behalf of the Executive Secretary of the CBD Secretariat, Mr. David Cooper thanked the Government of Mozambique for hosting the workshop. He stressed the importance of strengthening collaboration with WHO, other relevant organizations and representatives from the health sector to promote the consideration of biodiversity issues within national health strategies in line with the Libreville Declaration and to explore how implementation of the Strategic Plan for Biodiversity 2011-2020 could best support efforts to address global health issues and contribute to the Millennium Development Goals. He ended by noting that this workshop was the second in a series of regional workshops organized to address these issues, and that the deliberations of the week could help to identify opportunities for a more holistic approach by both sectors to promote human health and biodiversity, and serve as a model for other regions in Africa and beyond. Mr. Cooper then presented the subsequent speakers of the morning session.

10. On behalf of WHO and its regional office for Africa, Dr. Lucien Manga also welcomed guests and participants to the workshop, noting that this workshop would be an opportunity to strengthen cooperation between the biodiversity and health sectors by improving participants' understanding of the intersectoral linkages, also noting that this was a unique opportunity to contribute jointly to the objectives of the Libreville Declaration and of the Strategic Plan for Biodiversity 2011-2020.

11. The Permanent Secretary at the Ministry for Coordination of Environmental Affairs of Mozambique, Mr. Mauricio Xerinda, officially opened the workshop and thanked the CBD Secretariat and WHO for the opportunity to host the workshop. He highlighted the fact that Mozambique was very rich in biodiversity. He noted that prior to the Libreville Declaration on Environment and Health, Mozambique had already begun to carry out joint activities between the two sectors, for example by initiating a national policy on traditional medicine in 2004. However, the conclusion of the Libreville Declaration in 2008 further strengthened this commitment, strengthening the alliance between the two sectors. Mr. Xerinda wished all participants a fruitful workshop and formally opened the meeting.

ITEM 2. WORKSHOP OBJECTIVES AND EXPECTED OUTCOMES

12. Ms. Cristina Romanelli, CBD/WHO coordinating consultant on biodiversity-health linkages, facilitated self-introductions among the participants and asked them to discuss, with neighbouring

colleagues, their expectations, objectives and commitments towards the workshop and to write them down. The notes were shared orally and expectations discussed amongst participants at each table. Participants were asked to agree on one key objective/expectation per table. All points identified by participants were gathered for subsequent evaluation.

13. Several participants identified *"Gaining a better understanding of linkages between biodiversity and health"* as a priority outcome for the workshop. Among those identifying this issue, participants additionally specified the following objectives:

(a) To strengthen existing ties and *improve collaboration* between both sectors;

(b) To gain a better understanding of existing *constraints* to collaboration between both sectors;

(c) To gain an understanding of the *challenges* faced by different countries in the region seeking to link biodiversity and health policies and projects;

(d) To learn how to overcome *institutional barriers* constraining communication and action at international, national and local levels;

(e) To create a roadmap to better *identify and integrate* joint actions and activities geared toward comprehensive, cohesive solutions;

(f) To learn about existing *best practices* on joint biodiversity and health management in the region;

(g) To *evaluate experiences* from countries in the region that have already taken steps to incorporate biodiversity and health issues;

(h) By understanding needs in terms of biodiversity *regulation* important to human health;

(i) To *promote linkages* to overcome communication and cooperation barriers among institutions for actions on sustainable use, conservation and healthy socio economic systems;

(j) To better understand *priorities* to address issues relevant to biodiversity and health;

(k) To *research priorities* to identify linkages between biodiversity and health, how to *measure* these relationships under a unified system, and how to develop best practices for policy and management once we understand the relationships;

(l) To learn/discuss ways of fostering interlinkages between health and the environment in line with health sector priorities.

14. Other stated objectives included the following:

(a) To explore relationships between biodiversity and health and to identify concrete interventions and actions and outcomes that mutually benefit biodiversity and human health and to avoid adverse effects;

(b) To develop *a regional platform*/*national and regional frameworks* to jointly address biodiversity conservation and human health and well-being;

(c) To better understand *regulation* on plant extracts with medicinal properties;

(d) To better understand the official role of local health practitioners;

(e) To promote sustainable use and conservation of medicinal and nutritional biodiversity (especially medicinal plants) to improve human health;

(f) To strengthen the need for a unified health approach that includes human-animal-and environment ("One Health Approach") in the context of biodiversity conservation.

15. Mr. Cooper presented a summary of the expectations shared by the participants, noting that they aligned very well with the planned objectives of the workshop (see paragraph 8 above). He gave a brief overview of the agenda day by day. (The final agenda of the workshop is provided in Appendix 1).

ITEM 3. ADVANCING CO-BENEFITS BETWEEN HEALTH AND BIODIVERSITY AND MOVING TOWARDS COLLABORATIVE BEST PRACTICES: INTRODUCTORY PRESENTATIONS

16. Dr. Carlos Corvalán of the Pan American Health Organization/WHO introduced the next session which provided an overview of relevant work related to health-biodiversity linkages under WHO and CBD.

17. Dr. Corvalán presented the development of international environmental policy, from the 1972 United Nations Conference on the Human Environment, the first major global environmental conference which sought to demarcate the rights of people to a healthy and productive environment, to the 1992 United Nations Conference on Environment and Development which gave rise to the three Rio conventions to the 2012 United Nations Conference on Sustainable Development (Rio +20) that launched the process to develop a set of Sustainable Development Goals (SDGs) to build upon the Millennium Development Goals (MDGs) and converge with the post-2015 development agenda. Dr. Corvalán also provided an introductory overview of how increasing pressures on the Earth's ecosystems not only had significant repercussions on the earth's climate and environment but also on human health and well-being.

18. Mr. Cooper's presentation focused on the Strategic Plan for Biodiversity 2011-2020, its 5 strategic goals, and 20 Aichi Biodiversity Targets adopted in decision X/2, that the decision emphasized the need for capacity-building activities and the effective sharing of knowledge to support all countries, especially developing countries. Mr. Cooper began by introducing the Convention, its objectives, and the role and relevance of National Biodiversity Strategies and Action Plans (NBSAPs), noting that in decision X/2, the Conference of the Parties also urged Parties and other Governments to develop national and regional targets, using the Strategic Plan for Biodiversity 2011-2020 as a flexible framework, and to review, update and revise, as appropriate, their national biodiversity strategies and action plans (NBSAPs) in line with the Strategic Plan for Biodiversity 2011-2020 and the guidance adopted in decision IX/9. The Conference of the Parties additionally urged Parties and other Governments to support the updating of NBSAPs as effective instruments to promote the implementation of the Strategic Plan for Biodiversity 2011-2020.

19. Mr. Cooper also expanded on the linkages between biodiversity and health, discussing how biodiversity-related ecosystem functioned and the ecosystems goods and services they provided were foundations for and impact human health and well-being. He also explained how anthropogenic pressures had led to an overall decline in ecosystem services essential to human health and well-being, and the need to have concerted action to avoid reaching potential global "tipping points".

20. Mr. Cooper discussed linkages between human health and Aichi Biodiversity Targets, in particular Target 14 which states that *by 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable*. Mr. Cooper then presented different mechanisms available to support implementation and the next steps to follow. The relationship between biodiversity and health in relation to medicine, water, food, disease regulation, physical, cultural and mental well-being as well as climate-change adaptation were also discussed.

21. Dr. Lucien Manga delivered a presentation on the Libreville Declaration on Health and Environment in Africa adopted by environment and health ministers of 52 African countries in Libreville, Gabon during the first Interministerial Conference for Health and Environment in Africa, in 2008. In the Libreville Declaration, countries committed to implementing 11 priority actions to address health and

environment challenges in Africa and accelerate the achievement of the Millennium Development Goals. Dr. Manga indicated that the broad objective of the Libreville Declaration was to secure the political commitments necessary to catalyze the changes required to reduce environmental threats to human health, in a perspective of sustainable development.

22. Dr. Manga also noted that Africa's ongoing public health challenges of poor access to safe drinking water, hygiene and sanitation, inadequate infrastructure and waste management systems were extenuated by current environmental challenges such as those resulting from climate change, accelerated urbanization and air pollution. It was suggested that solutions were only feasible and cost effective if these challenges were addressed with integrated environment and health sector strategies. He further noted that the Libreville Declaration urged member States to implement priority inter-sectoral programmes at all levels in health and environment sectors. Dr. Manga elaborated on the history of negotiations, progress achieved in the implementation of the Libreville declaration to date and the need to make the link with biodiversity much more explicit in the context of implementation of the Libreville Declaration, for example in the development of countries' individual Situation Analysis and Needs Assessments (SANAs).

ITEM 4. INTEGRATING HEALTH AND BIODIVERSITY POLICIES WITH NATIONAL BIODIVERSITY STRATEGIES AND ACTION PLANS (NBSAPS) AND NATIONAL PLANS OF JOINT ACTION (NPJAS) FOR THE IMPLEMENTATION OF THE LIBREVILLE DECLARATION

23. This agenda item was carried out over three days. Participants were asked to conduct a self-assessment of the progress achieved in terms of integrating biodiversity and human health considerations in their NBSAPs and NPJAs. Prior to the workshop, all participants were asked to prepare 5-10 minute country presentations, reporting on their national objectives, achievements and challenges of implementation. The questions were as follows:

a) In the context of the implementation of the Strategic Plan for Biodiversity 2011-2020 and the Libreville Declaration:

   1) What joint actions could the health and biodiversity sectors take at the national level in order to develop policies and promote activities that try to achieve co-benefits for human health and biodiversity?

   2) What would be the key elements for a joint human health and biodiversity action plan? At what scale (local, sub-national, national, regional and global) do you think that this would this be most effective?

   3) What is needed, at the national and regional scales, in terms of research, capacity building and information dissemination for joint human health and biodiversity sector actions?

   4) What, if any, are the best practices in your country that jointly address human health and biodiversity concerns and opportunities?

   5) What collaborative mechanisms/examples currently exist within your country or region for cross-sector human health and biodiversity collaboration? How can we promote further collaboration? What impedes collaborative action?

   6) What actions for human health and biodiversity are needed as a matter of urgency (1 year); medium term (2- 5 years); and in the long term (6 – 8 years)?

24. Participants from each country delivered national presentations, jointly prepared by the experts from the health and biodiversity sectors, to address each of the questions. Presentations on the first day of the workshop were experts Ms. Marie-May Jeremie and Mr. Kevin Gaetan Pompey (Republic of Seychelles), Mr. Jean Bosco So and Mr. Siaka Banon (Burkina Faso), Mr. Edmund Dlamini (Swaziland), and Mr. Mike Ipanga Mwaku (the Democratic Republic of the Congo).

25. Additional country team presentations were delivered on the second day of the workshop by Mr. Ndegwe, representing WHO Kenya, who delivered a presentation on the implementation of the Libreville Declaration in Kenya. The presentation was followed by country group presentations by Ms. Florencia Cipriano (Mozambique) and Mr. Tšasanyane and Mr. Thekiso (the Kingdom of Lesotho). Each of the presentations was followed by a series of question and answers. All remaining country team presentations by: Ms. Aurélie Flore Koumba Pambo (Gabon); Mr. Aloys Ndizeye (Burundi); Ms. Rasoavahiny and Ms. Rakotoarison (Madagascar); Dr. Morupisi and Mr. Seakanyeng (Botswana); Mr. Mangwadu and Mr. Njovana (Zimbabwe); Dr. Issis Julieta P.F.G. Ferreira (Guinea Bissau); Mr. Graça Almeida Ribeiro (Cape Verde); Ms. Bakissy Da Costa Pina (Sao Tome and Principe); Mr. Abdou Salam Kane (Senegal); Dr. Chamssoudine and Mr. Mohibaca (Comoros); Dr. Bilivogui (Guinea); Ms. Masekwameng (South Africa); and Mr. Ondo Obono (Equatorial Guinea) respectively, were presented on the third day of the workshop.

26. Processes in each country for integrating health and environment issues, including biodiversity issues, were described in most of the presentations. Some of the best practices and collaborative initiatives between the health and environment sectors presented during the presentations include:

Angola

- Carrying out the First National Conference on Sanitation (AngoSan1) in Nov. 2011, the objectives of which included ensuring water quality;
- Creation of the Community Led Total Sanitation (CLTS) approach which works at provincial, municipal and community levels (CLTS). In 2008, when the CLTS began as a pilot project, the new Ministry of Environment (MINAMB) was created to renew the Government's commitment to environmental sanitation and to create the Technical Unit National Environmental Sanitation (UTNSA). It must also work collaboratively with other ministries with shared responsibilities in environmental sanitation, through the Intersectoral Technical Group (MOH, MED, MINEA, SDR, MAT) and other coordination mechanisms;
- Carrying out the First International Conference on Waste in Africa (July 2012);
- Creation of the Center for Tropical Ecology and Climate Change;
- Memorandum of Understanding between Health and Environment sectors on Environmental Surveillance.

Botswana

- SANA process was initiated in 2011 for which comprehensive data were collected;
- Multi-Sectoral committees on climate change and other issues including various government and non-governmental sectors were formed;
- An NBSAP was developed in 2004 and revised in 2007;
- Various projects focusing primarily on the management of protected areas, wetland resources (ODMP) and drylands (MFMP) were implemented nationally;
- The Poverty and Environment Initiative (PEI) was launched to (i) enhance integration of equitable and sustainable development in national-, sector- and district-level policies, plans, budgets and monitoring systems; and (ii) improve knowledge and use of integrated frameworks, approaches, tools, methodologies and assessments for sustainable utilization of environment and natural resources. The main institutions involved in the joint GOB-UNDP-UNEP program from the Government of Botswana are: the Ministry of Finance and Development Planning (MFPD) (lead agency) and the Ministry of Environment, Wildlife and Tourism (MEWT) as well as the Ministries of Local Government, Agriculture, Health and Minerals and Water Resources;
- An early warning system (EWS) was implemented. Central to the system is the National Early Warning Unit under the Ministry of Agriculture, which collects and compiles information on food security, animal and range conditions as well as climate data from the different departments within the Ministries of Agriculture and Environment, Wildlife and Tourism; nutritional data

from nutritional surveillance system under the Ministry of Health; and data on food and feeds stocks from the Botswana Agricultural Marketing Board (BAMB) and other stakeholders.

Burkina Faso

- Creation of public botanical gardens and/or private conservation of plant species;
- Creation of communal forests in the context of decentralization;
- Development of a national strategy and promotion of non-timber forest products (NTFPs) taking into account medicinal NTFPs;
- Promoting proper harvesting practices of NTFPs including medicinal NTFPs used in herbal medicine and/or by pharmaceutical companies;
- Organizing local actors involved in the exploitation of natural resources for human health (in the case of traditional healers);
- There are existing mechanisms for intersectoral collaboration such as the Conference of the National Council for the Environment and Sustainable Development (CONEDD) and Framework consultations with municipal, provincial, regional and national levels.

Burundi

- Drafting national hygiene and basic sanitation policy;
- Updating the code of hygiene;
- Development of the Strategic Plan of Hospital Waste Management.

Comoros

- Progress toward the implementation of the Aichi targets includes:
    - Improving species knowledge;
    - Developing mechanisms and capacities for the sustainable management of ecosystems;
    - The creation of four protected areas;
    - Joint projects with PNDHD, FAO, GSP, GEF, UNDP;
    - Establishing a laboratory on water analysis (INRAPE) to the UDC;
    - Working with supporting partners such as: WHO, UNICEF, UNEP.

Democratic Republic of the Congo

- The implementation of the “One Health Approach” with the establishment of a Coordination Committee (COCUS) that promotes a multidisciplinary and multi-stakeholder approach to issues that affect human health;
    - The COCUS facilitates the interaction and cooperation of government agencies (Ministries of Health, Agriculture and Environment) and between agencies mandated in public health, animal health and wildlife;
    - The COCUS also facilitates the planning, coordination and more efficient conduct of response activities and monitoring. It is placed under the supervision of the Ministry of Scientific Research and University Education;
- Establishment of the USAID-funded "Respond" project which led to the organization of a regional workshop on a capacity-building approach to health, bringing together participants from the DRC, Congo, Gabon and Cameroon.

Kenya

- A Situation Analysis and Needs Assessment (SANA) was finalized in 2009 and National Plan of Joint Action (NPJA) was finalized in 2011. Kenya is currently in the Implementation, Monitoring and Evaluation phase which would seek to institutionalize the HESA;
- The implementation of the Libreville Declaration process in Kenya has resulted in: the delineation and protection of riparian reserves to enhance restorative and self cleansing capacity;

the development of an integrated solid waste management strategy; the enforcement of environmental legislations; and the development of sanitary landfills.

Gabon

In the area of traditional medicine examples include:

- The use of biodiversity for the production of Improved Traditional Medicines (IPHAMETRA);
- The establishment of the Organization of Traditional Healers;
- The creation of a project to develop a catalog/register of traditional knowledge associated with genetic resources.

Guinea

- The development of a SANA and involving the biodiversity Focal Point in the technical validation of the SANA;
- The development of a poverty reduction strategy;
- Demographic and Health Surveys;
- Sectoral plans (health environment, habitats etc.);
- Study on health and environmental impacts for the installation of mining projects, industrial and oil exploitation;
- The development of the national development budget;
- Carrying out a study of vulnerability and adaptation to climate change in the health sector.

Guinea Bissau

- Protection of protected areas;
- Construction of health posts and subsidies to health staff;
- Supply of laboratory materials for sanitary control of food;
- Participation in the health sector in developing rules and laws;
- National awareness campaign for health.

Lesotho

- Lesotho National Plans of Joint Action (NPJA) addresses eight priority areas identified during SANA process and it is linked to the NSDP 2012–2017 through 4 goals and 6 strategic objectives, the latter of which include improving the relevance and applicability of skills; developing innovation culture and capacity for scientific research; improving skills through capacity-building and providing appropriate incentives to retain skilled health professionals; increasing resilience to climate change; improving environment and climate change governance and improving aid mobilization, effectiveness, management and coordination;
- The establishment of a Lesotho Country Task Team and Advisory committees that include line ministries, the private sector, community based organizations, non-governmental organizations, academia and others.

Madagascar

- Development of environmental consciousness in schools and public institutions;
- Use of drugs from medicinal plants in public health facilities;
- Institutionalization of traditional healers;
- Working Group "Human Health and the Environment" set up in the framework of the implementation of the Libreville Declaration; Development of an NBSAP which focuses on links between "Human Health and Biodiversity";
- Establishment of a National Coordinating Committee on Biosafety; Working Group "Climate and Health", and of the SAICM Committee on Chemicals Management.

Malawi

- Malawi developed a national strategy for sustainable development in 2004 covering the main thematic areas of water, energy, health, agriculture and biodiversity among others based on the Declaration of the 2002 Johannesburg World Summit on Environment and Development. The strategy covers sectoral issues including health;
- The Malawi National State of Environment and Outlook Report of 2010 contains full chapter on health issues;
- The Health Sector Strategic Plan (HSSP) has outcomes of which one of them is reduced risks to health that are mostly environmental in nature;
- UNIMA has been working with traditional healers to identify phyto-chemical properties in medicinal plants and testing their drug efficacies;
- Traditional Healers Association replanting medicinal plants in some areas.

Mozambique

Since the signing of the Libreville Declaration, joint actions on biodiversity and health gained dynamism, whereby the Ministers of Health and Environment strengthened their strategic alliance through:

- National policy on traditional medicine (2004);
- National Campaign for Environmental Sanitation (2008);
- Implementation of regulations on Biomedical Waste Management and the management of obsolete pesticides;
- Education, Environmental Communication and Dissemination Program (PECODA) (2009);
- National Strategy for the Promotion of Health;
- Multisectoral Plan to combat cholera;
- Strategy for the Conservation of Biodiversity (2003);
- Strategy of Gender and climate change;
- Database on Medicinal Plants (2007).

Sao Tome and Principe

- Creation of national parks which occupy 30% of the country (primeval forest and rivers);
- Development of the 1st and 2nd NBSAPs;
- Creating a Legal Framework on Biosafety (biotechnology);
- Developing a Plan for Biomedical Waste Management;
- Developing an Action Plan for Integrated Solid Waste;
- Developing a contingency plan for natural disasters and climate change;
- Raising awareness about the effects of washing impregnated nets used in the fight against Malaria;
- Drainage of some wetlands as niches for the breeding of mosquitoes;
- Training on the risks of invasive species (e.g. *Archachatina marginata*) and bushmeat.

Senegal

- Polmar Plan to combat marine pollution;
- NBSAP revision;
- Study and characterization of medicinal plants;
- Adoption of a national development strategy;
- SERE Program (e.g. Pollution, plastic and other waste, biodiversity, production of documentary films);
- Involvement of public participation (health centre officials, students, faculty, academia, etc.).

South Africa

- Recognition of traditional medicine by the health ministry and some municipalities

- Policies and forums. E.g.: a public consultation process with government and non-governmental organizations, research institutions, traditional healer representatives and private sector organizations was launched to address the needs of the traditional medicine sector, which led to the introduction of new legislation and programmes to regulate and promote indigenous knowledge. This led to the enhancement of the primary health care sector; increased access to treatment; economic and community development; and, scientific advancement from the research and development of medicinal plants;
- National Climate Change and Health Adaptation Plan which addresses climate change factors and impacts on health;
- Various ministries have been provided human and financial resources to address environmental determinants of health;
- Establishment of research institutions such as South African National Biodiversity Institute (SANBI), Medical Research Council (MRC), Council for Scientific and Industrial Research (CSIR), Agricultural Research Council (ARC) which generate health, biodiversity & environment-related research reports;
- Established academia and basic education institutions which cover health and biodiversity;
- Initiative underway to record, preserve, protect and promote South Africa's traditional knowledge with the launch of the National Recordal System (NRS).

Swaziland

- Collaboration between the ministries of health, environment, agriculture, the Swaziland Environment Authority (SEA), universities, and other sectors e.g. on environmental issues such as the POPs convention, climate change and others;
- Swaziland has not yet undertaken the SANA for the preparation of plans of joint action, however a multidisciplinary team has been identified and it includes the Ministry of health, the Swaziland Environment Authority, Meteorology department, the City Councils, University of Swaziland, the World Health Organization and Non-governmental Organizations. A budget has been provided by the WHO to finalize the National Adaptation Plan and upon completion of the NPJA, the SANA process will resume;
- WASH forum dealing with water, sanitation and hygiene issues;
- Enabling legislation in the environment and health sectors such as the Environment Management Act and regulations and the Public Health Act and its regulations.

Uganda

- Well developed institutional frameworks;
- Regulatory framework in place i.e. Environment and health enforcement;
- Afforestation;
- City green belt;
- Conservation of Medicinal Plants centres, cultural institutions etc. at the community level;
- Baseline information on biodiversity trends, status and species diversity;
- There is a National Environmental Health Policy (2002) that needs to be reviewed and biodiversity issues will be included during the review.

Zimbabwe

- Creation of a Biosafety Council;
- Creation of a Traditional Medical Practitioners Council;
- Department of Traditional Medicine in the Ministry of Health and Child Welfare;
- Strong collaboration between the Ministry of Health and Child Welfare and the Ministry of Environment and Natural Resources Management;

- Within the Ministry of Health there is the Sector Wide Approach (SWAP), which will facilitate the implementation of the SANA.

27. Other key elements raised by particular countries during these presentations are included in annex III.

28. Following the first series of presentations, an interactive exercise tasked participants to identify, in small break-out groups working in English, French or Portuguese, potential activities that can be carried out jointly by the health and biodiversity sectors, obstacles to collaboration and some solutions. Some of the main conclusions of this exercise were:

Examples of joint potential areas of collaboration:

(a) Make a joint inventory and needs assessment (identification of stakeholders health/ environment, institutional review, review of legislation and regulations);

(b) Jointly identify priority themes that link health / biodiversity (integrated action plan)

(c) Policy on traditional medicine;

(d) Climate change;

(e) Vector-borne diseases;

(f) Water and food borne diseases;

(g) Emergence of new invasive alien species;

(h) Community-led sanitation measures;

(i) Creation of multisectoral teams for the use of chemical products in agriculture;

(j) National contingency plan of joint action;

(k) Implementation of environmental best practices;

(l) Approval of rules and legislation.

Key obstacles to collaboration:

(a) Fragmented policies and institutions;

(b) Partitioning of sectoral policies;

(c) Lack of a coordinating committees;

(d) Absence / lack of formal consultative frameworks or formal partnerships between the environment and health sector;

(e) Financial constraints: Inadequate funding to support work carried out in these sectors;

(f) Insufficient human resource capacity for joint action health / environment

(g) Resistance to behavioural change;

(h) Lack of Coordination, Partnership between the two sectors;

(i) Lack of a common policy and financial resources shared by concerned Ministries;

(j) Lack of political ‘buy in’;

(k) Too many competing priorities.

Potential solutions to increase collaboration:

(a) Creating MOUs between the health and environment sectors;

(b) Increasing financial resources;

(c) Implementation of relevant legislation;

(d) Including the health sector in NBSAPs;

(e) Implementing communication and environmental awareness programs;

(f) Implementing disclosure requirements relating to environmental matters;

(g) Setting up:

- Multisectoral working groups;
- Planning frameworks at the local, national and regional levels;
- Devices for monitoring and evaluation of joint actions;

ITEM 5. OPPORTUNITIES AND CHALLENGES FOR KEY BIODIVERSITY AND PUBLIC HEALTH ISSUES

29. A number of presentations to introduce various key issues relevant to biodiversity and public health were delivered by experts selected following a tendering process which specifically sought experts to address the following key issues: (a) zoonotic and vector-borne diseases; (b) gender health and natural resource management as they pertain to water and food systems, and; (c) traditional medicine and indigenous knowledge. A brief summary of the presentations is included here as annex II.

30. On the second day of the workshop Dr. Kathleen Alexander, representing the Center for African Resources: Animals, Communities and Land use (CARACAL) in Chobe, Botswana, opened this item with a presentation which discussed the manner in which development, public health, and environmental management were integrated into policy and planning and the repercussions on biodiversity and health of ecosystems, humans, and animals. She addressed the question of why biodiversity considerations should be integrated into public health policy and how better management of biodiversity and ecosystem services lead to improved health outcomes.

31. Several examples based on work carried out in Africa were used to illustrate the importance of establishing linkages between public health and biodiversity. Water quality and health were identified as ongoing problems globally and particularly in Africa. Work carried out on climate-health interactions in Botswana identified important linkages between human health (diarrheal disease in particular), wildlife health, landscape change, and degradation in ecosystem services related to water quality and sanitation deficiencies.

32. Dr. Clara Bocchino and Dr. Micheal Murphree, both representing the Animal & Human Health for the Environment And Development (AHEAD) consortium, delivered a presentation on a One Health approach to transfrontier conservation, using the Great Limpopo Transfrontier Conservation Area (GLTFCA), established by a multi-lateral treaty in 2001, as a case study to highlight the critically important linkages between wildlife health, domestic animal health, and human health and livelihoods. They noted that there were many critical issues that existed at that interface but that the issue of transboundary diseases and their control in particular stood out. They described health considerations as an important variable of and driver to development, particularly in highly stressed areas, characterized by human insecurity, erratic climate and human-wildlife contact. They further addressed the drivers of human health, wildlife health and ecosystem health in the GLTFCA.

33. Dr. Elizabeth Van Wormer, of the Health for Animals and Livelihood Improvement (HALI) project in Tanzania, a joint project between Sokoine University of Agriculture and University of California, Davis, delivered a presentation focusing on linkages between on zoonotic disease and biodiversity. In the context of HALI's One Health Approach in the biologically diverse Ruaha ecosystem and other Tanzanian ecosystems, she addressed the potential for land-use change and other anthropogenic activities to alter disease transmission at the human-animal-environment interface. She noted that the majority of emerging infectious diseases (EIDs) in people were of animal origin (zoonotic), with 75% of emerging zoonoses having wildlife origins. She additionally discussed livestock health, human nutrition, and issues pertaining to pastoral livelihoods and presented the PREDICT project of USAID's Emerging

Pandemic Threats Program, which was building a global early warning system to detect and reduce the impacts of emerging diseases that move between wildlife and people.

34. Following this initial set of thematic presentations, as indicated under item VI, participants were provided a series of questions to discuss the positive and negative impacts of biodiversity on human health, and how to maximize positive impacts. Participants broke out into English, French and Portuguese working groups. One or more of the experts working on thematic presentations assisted each group. At the start of the afternoon session, one person from each group presented the results of the group discussions. These results are summarized in annex IV.

35. Once thematic presentations resumed, Dr. Christopher Golden, from Harvard University Center for the Environment and School of Public Health, representing the HEAL programme, delivered a presentation on the relationships between human health and environmental conservation, he addressed: the nexus of environmental change and human health; wildlife consumption and human nutrition; broad connections of environmental resources and human health and discussed future directions in terms of research and interventions. His presentation also provided a thorough case study based on the Makira watershed in Madagascar, noting that the nutritional value provided by biodiversity, zoonotic disease sampling, laboratory work carried out and some of the successes in the coupling of biodiversity and public health strategies in the region, have had positive impacts on culture, religion, gender equity and economics.

36. Dr. Golden's presentation also highlighted that we did not have a clear understanding of whether, or how, differences in ecological conditions affected human health, directly or indirectly, further noting that the five-year HEAL science to policy to action initiative was targeted at addressing this critical gap at a range of scales. At the time, there had not been any definitive examination of the relationship between the state of natural systems and human health. The public health community had not systematically considered the role that natural ecosystems may play in affecting human health. Similarly, the conservation community had not systematically considered how loss or conservation of natural ecosystems may be impacting public health. However, interest on both sides was increasing as awareness grows regarding the ways that management of natural systems may impact disease and associated societal costs. Following the presentation several questions were received from the floor including a number of questions addressing the "dilution effect", the potential for biodiversity to regulate disease, discussed by Dr. Golden.

37. The following thematic presentation was delivered by Dr. Wasike who discussed mainstreaming biodiversity conservation and sustainable use for improved human nutrition and well-being, using Kenya as a case study. Dr. Wasike discussed how increased reliance on major crops, which led to reduced crop diversity, was compounded by globalizing trends. He also presented the *Biodiversity for Food and Nutrition* project, as a vehicle for implementing the CBD's cross-cutting initiative on Biodiversity for Food and Nutrition. He noted that a decrease in crop diversity was concomitant with a decrease in the nutritional value of crops and that the aim of the project was to strengthen the conservation and sustainable use of biodiversity with high nutritional potential, by mainstreaming into nutrition, food and livelihood security strategies and programmes; develop markets and value chains for nutritionally-relevant biodiversity. He noted the need for a cross-sectoral approach involving a variety of sectors and actors. Examples of cross-sectoral collaboration and South-South cooperation in Brazil, Kenya, Sri Lanka and Turkey were also provided. He also addressed the use of different plants, fruits and fungi used for medicinal purposes.

38. The final thematic presentation during the second day was provided by Dr. Florencia Cipriano, World Organisation for Animal Health (OIE) Deputy Regional Representative for Africa, who focused on the role of OIE to support biodiversity and the need of good governance for managing natural resources. She began by providing an introduction to the OIE's guidelines, mandate and international standards, highlighting collaborative work on the issue of invasive alien species. She noted the growing importance of zoonotic animal pathogens and described the implications for human health, wildlife health and

domestic animals, also noting that changes in land use and management often lead to new interfaces that may favour disease transmission and loss of biodiversity.

39. Dr. Cipriano also indicated a series of reasons for which biodiversity protection was important, and highlighted the need to strengthen collaboration between animal, human health and environmental health initiatives under the banner of One Health. The presentation ended with a series of recommendations and relevant tools OIE had made available and the need for strengthened OIE-WHO-CBD collaboration.

40. The final set of thematic presentations for the workshop was delivered by selected experts on the third day of the workshop. Dr. Sekagya Yahaya, representing PROMETRA International, who discussed the issues of indigenous knowledge, traditional medicine and public health, delivered the first of these presentations. Dr. Yahaya emphasized the close relationship between cultural and biological diversity and how sustainable use was often at the heart of the cultures and values of indigenous peoples. Dr. Yahaya noted how biological resources were not only a source of livelihoods but also a foundation to the cultural and spiritual identities of indigenous populations.

41. Dr. Yahaya also discussed his own work in strengthening traditional medicine and biodiversity, including activities of PROMETRA Uganda, and additionally discussed potential public health priorities in Africa as well as needs and strategies for strengthening traditional medicine. Following Dr. Yahaya's presentation numerous questions were raised by the floor, including a series of questions addressing the formal acceptance of traditional medicine.

42. Dr. Daniel Buss, representing FIOCRUZ delivered a presentation on water as an ecosystem service and its role as a provisioning, regulating and cultural service essential to human health and well-being. A broad range of international case studies were discussed, as well as challenges and potential strategies and new approaches to engage a greater number of stakeholders in the management of ecosystem services, for example, with scientific & environmental education programs, by involving a broad range of stakeholders in negotiations and empowering communities.

43. Dr. Buss also discussed the repercussions of bad ecosystem management of water resources on public health for example by an increase in waterborne diseases (such as cholera and hepatitis), or the potential of bioaccumulation. Conversely, the potential negative repercussions of the health sector on biodiversity such as the integration of medications in the natural environment could act as endocrine disruptors and had a number of health impacts ranging from cancerous tumours to developmental disorders. Antibiotic Resistance Genes (ARG), nanoparticles and cyanotoxins were also discussed. The presentation concluded on strategies for the post-2015 development agenda.

44. The last presentation under this item was mainstreaming gender health into NBSAPs in Africa, delivered by Dr. Chimwemwe Ganje Mawaya. She first explained the meaning of gender, explaining that women and men's differential access to resources was one of the key aspects of gender inequality. She noted that African cultures were diverse and that, generally, gender roles and spaces, which usually determined how the different gender groups accessed, used, controlled and managed biodiversity, were most often the result of the social construction of gender. She noted that in most cases this created gender differentials of human impacts on biological diversity, which in turn resulted in different impacts on the health of the different gender groups.

45. Dr. Ganje Mawaya also presented on why it was important to consider gender, and its implications for integrating it into NBSAPs, most notably in relation to water and food systems so that negative impacts on biodiversity loss and consequently gender health could be minimized. In addition, incorporating and promoting innovative gender sensitive strategies in NBSAPs could ensure that both men and women health issues were taken into account in sustainable use and conservation of biological diversity. Men and women interacted differently with biodiversity and dependency of their health on biodiversity presented the men and women with different opportunities to sustainably use and conserve biodiversity.

46. Two comments were received from the floor. One participant noted that gender was dynamic both in spatial and temporal terms, especially in developing economies, where men migrate to towns, cities and other countries, and where women were increasingly bearing more burdens. Another participant noted that diverse cultures and gender roles and responsibilities created a challenge for tackling biodiversity and gender issues.

Field Study Visit

47. On the morning of the final day of the workshop, participants visited Ihla dos Portugueses (Portuguese Island), an uninhabited island, located some 200 meters north east of Inhaca Island in Maputo Bay. On the nearby Inhaca Island there is a Marine Biological Station of Inhaca, a Research Department of the Faculty of Sciences at Eduardo Mondlane University.

48. Dr. Armando, of the Marine Biological Station provided an introduction to the field study component of the workshop, explaining that the station was established in 1951 to support research activities in winter at the University of Witwatersrand in South Africa. Dr. Armando followed discussion on the Biological station with a broader presentation on the focusing on the Marine Reserve explaining that the Marine Reserve had a rich diversity of corals and marine life and was the most important leatherback and loggerhead turtle nesting ground along the Mozambican coast. Following the presentation, participants had the opportunity to ask questions and have one-on-one discussions with Dr. Armando before leaving the island and returning to the workshop venue for the final sessions.

ITEM 6. POLICY OPTIONS AND STRATEGIES: DISCUSSION AND SYNTHESIS

49. Potential policy options and strategies were discussed in break-out sessions throughout the course of the workshop and also drew upon presentations and discussions under agenda items 3, 4 and 5 including, in particular, the group discussions following the first round of country team presentations presented under item 4 and following the first round of thematic presentations covered under item 5.

50. Once all the country team presentations under items 4 and 5 were completed, it was agreed that the Secretariat would prepare a list of conclusions/key recommendations derived from the workshop, based on the discussions of the workshop and on key elements of country team presentations. It was agreed that these conclusions would be presented to participants for discussion on the last day of the workshop following the field study visit.

ITEM 7. SYNTHESIS AND CONCLUSION OF THE WORKSHOP

51. Reflecting on the presentations made during the workshop, the Secretariat prepared and circulated a draft list of conclusions which was reviewed by participants who provided feedback and additional comments. The conclusions are listed below.

52. Following the field study visit on the final day of the workshop, a draft summary of main conclusions derived from the workshop was distributed, in English and in French, for review and subsequent discussion of participants. Dr. Carlos Corvalán facilitated the discussion as participants reviewed and discussed each of the proposed conclusions one by one.

53. The results of this final session, further revised by the organizers based on comments made by participants during the workshop, and presented to participants for their subsequent approval, are presented in annex I.

54. Closing remarks were delivered by Dr. Manga on behalf of the World Health Organization. He thanked participants and all co-organizers of the workshop including the Secretariat of the Convention on Biological Diversity, and the Oswaldo Cruz Foundation. On behalf of the Executive Secretary of the Convention on Biological Diversity, Mr. Cooper also gave some closing remarks, thanking all the co-organizers, all the country representatives and experts for their participation in the workshop and, once again, thanking Mozambique for their important contribution as hosts of the workshop. He also thanked the Japan Biodiversity Fund, FIOCRUZ and WHO for financial support provided for the workshop.

Annex I

WORKSHOP CONCLUSIONS/RECCOMENDATIONS

1. Addressing biodiversity-health linkages will contribute not only to achieving health outcomes and biodiversity outcomes but also contribute to poverty reduction, disaster-risk reduction, and sustainable development more broadly, including in the context of the post-2015 development agenda.

2. The relationship between biodiversity and health is multifaceted and complex. It is part of the broader relationship between the environment and health, but not identical to it.

3. The components of biodiversity and ecological processes underpinned by biodiversity support health in many ways:

(a) Plant and animal species are sources of traditional medicines, and together with microorganisms, are sources of and models for pharmaceuticals;

(b) Plant and animal species, wild and domesticated, and their genetic varieties and races, are sources of food, providing the full range of essential nutrients;

(c) Genetic diversity and species diversity underpin ecosystem resilience and provide options for crops and livestock improvement; both of these allow for adaptation to changing circumstances, including climate change;

(d) Biodiversity underpins ecosystem functioning, which allows ecosystems to provide services such as clean water, support agricultural productivity (e.g.: through pollination, nutrient cycling, etc.), and regulation of diseases.

4. Biodiversity and ecosystems may also be related to adverse health effects, in some cases, and particularly when ecosystems are not well managed, notably through disease organisms.

5. The health benefits of biodiversity are largely dependent on social dimensions (e.g.: gender, poverty, etc.) and may be specific to local ecosystems and cultures. The different roles of men and women in access to, and the use, control and management of natural resources and the implications for health, as well as the different responsibilities of men and women for health care, need to be recognized. Poor and vulnerable communities, and women and children, are often particularly dependent on biodiversity for food, clean water and medicines.

6. Traditional indigenous and local knowledge, as well as conventional scientific knowledge, associated to biodiversity can be very important in realising the health benefits of biodiversity.

7. The CBD and the Nagoya Protocol provide an international legal framework for the fair and equitable sharing of benefits arising from the use of genetic resources, and associated traditional knowledge.

8. The linkages between biodiversity and health can be enhanced in several ways:

(a) By promoting the health benefits provided by biodiversity set out in paragraph 3. In turn this provides a rationale for the conservation and sustainable use of biodiversity as well as the fair and equitable sharing of benefits;

(b) By managing ecosystems to reduce the risk of infectious diseases, including zoonotic and vector-borne diseases, for example by avoiding ecosystem degradation and limiting or controlling human-wildlife contact;

(c) By addressing drivers of environmental change (deforestation and other ecosystem loss and degradation and chemical pollution) that harm biodiversity and health, including direct impacts on health, and those mediated by biodiversity loss;

(d) By promoting lifestyles that might contribute to both health and biodiversity outcomes (e.g.: protecting traditional foods and food cultures, promoting dietary diversity, etc.)

(e) By addressing the unintended negative impacts of health interventions on biodiversity (e.g.: antibiotic resistance, contamination from pharmaceuticals) and by incorporating ecosystem concerns into public health policies, and also by addressing the unintended negative impacts of biodiversity interventions on health (e.g.: effect of protected areas on access to food, medicinal plants, etc.).

9. Implementation of the Libreville declaration provides opportunities to integrate biodiversity into national health strategies and the National Joint Plans of Action for health and the environment.

10. There is a need to integrate health-biodiversity linkages into national health strategies, and the work of national institutes of health and other national plans and programmes and relevant legislation. Health-biodiversity linkages should be considered in environmental impact assessments and strategic environmental assessments, as well as in health impact assessments. Economic valuation can be a useful tool for assessing the contribution of biodiversity and ecosystems to health.

11. The experience of the countries in the African region in following up on the Libreville declaration, including through the elaboration of SANAs and NJPAs, and through intersectoral multi-disciplinary country task teams, provides useful examples and lessons for other countries and for the integration of biodiversity and health more generally. However, in some countries, there is a need to further strengthen cooperation and joint work between health and environment ministries, including the establishment of cross-sectoral initiatives. In some countries there is also a need and an opportunity to identify more clearly the specific linkages between biodiversity and health within the broader area of environment and health. This should include recognition of The Strategic Plan for Biodiversity 2011-2020 and its 20 Aichi Targets. There is a need for increased funding for these activities in most countries.

12. The ongoing revision of NBSAPs provides an opportunity to reflect health-biodiversity linkages into biodiversity planning processes. The Strategic Plan for Biodiversity 2011-2020 including its 20 Aichi Targets provides a useful framework. Target 14 is particularly relevant. Other relevant guidelines have been developed under the CBD and by WHO, among others.

13. There is a need to develop practical tools to facilitate the integration of biodiversity into health strategies (and vice-versa), for example through guidelines, or simple checklists of issues, noting the need to distinguish between the specific issues related to biodiversity and the more general environmental issues.

14. There is a need to further share knowledge and experiences related to biodiversity-health linkages among countries and with international and national partners. A mechanism to facilitate this should be promoted and funded.

15. There is a need to promote training and capacity-building of professionals in both sectors, as well as indigenous and local communities.

16. There is a need to need to raise awareness and develop education programmes on the importance of health-biodiversity linkages at various levels, so as to enhance support for policies and their implementation. There is also a need to promote further research on these issues, including by strengthening pan-African research collaboration to address knowledge gaps and to incorporate social and cultural perspectives as well as religious values that serve to protect biodiversity and promote health.

17. WHO and CBD, together with FIOCRUZ and other relevant organizations, are encouraged to further develop their joint work programme on health-biodiversity linkages, including further work to synthesis and analyse relevant scientific information and to support the development of a roadmap for further action, including work by countries in the framework of the Libreville Declaration as well as links with other relevant international conventions, protocols and agreements.

Annex II

SUMMARY OF THEMATIC PRESENTATIONS

***Note**: Presentations below are grouped thematically as they were in the call for tenders. Please refer to the appendix for the agenda, which indicates the order in which presentations were delivered.*

All thematic presentations can be accessed at http://www.cbd.int/en/health/africa/presentations

Infectious and Zoonotic Diseases

1. Infectious Disease, Community Livelihoods and Ecosystem Health
Presented by: Dr. Kathleen Alexander

The manner in which development, public health, and environmental management are integrated into policy and planning affects biodiversity and health of ecosystems, humans, and animals. Institutions are already over burdened with workloads and responsibilities. Why should we incorporate biodiversity considerations into public health? Can we secure improved public health outcomes through better management of biodiversity and ecosystem services? Examples of CARACAL's work in Africa was presented to illustrate the importance of establishing linkages between public health and biodiversity and provide a compelling case for integrating these elements into government and institutional structures, policy, and planning as partner components.

Water quality and health are identified as emergent problems globally and particularly in Africa. Dr. Alexander's work on climate-health interactions in Botswana identifies important linkages between human health (diarrheal disease), wildlife health, landscape change, and degradation in ecosystem services related to water quality and sanitation deficiencies. It also examined human population vulnerability arising from a variety of factors including ecosystem degradation and loss of biodiversity an increased susceptibility to forecasted climate change impacts if these vulnerabilities are not addressed. Moreover, the work also identifies human presence and landscape transformation as an important contributor to the spread of antibiotic resistance and microorganism transmission potential at the human-wildlife interface. Evidence of high levels of antimicrobial resistance among various wildlife species, even within protected areas, are recognized as an emerging health threat and highlights the need for improved waste management in these systems. As humans encroach into natural areas, contact between humans and wildlife escalates. The zoonotic disease research program discussed identifies interactions between biodiversity, land use, poverty, cultural practices in bush meat utilization, and potential increased risk of exposure to important zoonotic diseases such as leptospirosis and brucellosis. Additionally, gender differences in the dependency on natural resources, access to capital, wildlife conflict, and household impacts from HIV/AIDS were identified as important influences creating inequalities in the vulnerability of populations, declines in ecosystem services, and health impacts.

It was argued that public health can be strongly impacted by changes to ecosystem services. Sustainably managing biodiversity and securing ecosystem services can save money, lives, and reduce public health threats. Following Dr. Alexander's presentation, workshop participants at the meeting discussed the importance of the biodiversity–human health interface and the need to identify practical areas of need where sustainable management of biodiversity and ecosystem services translates into improved health outcomes. It was noted that efforts are more likely to be successfully sustained if they can address current areas of need.

Full presentation available at:
http://www.cbd.int/getattachment/health/africa/presentations/maputo_alexander_infectious.pdf

2. **The Relationship Between Human Health and Environmental Conservation**
Presented by: Dr. Christopher Golden

Around the world, wildlife populations in terrestrial, marine, and freshwater systems are in decline as a result of habitat destruction, over-exploitation, pollution, invasive species, and other causes. While these declines are profoundly alarming in their own right, they also represent a significant public health threat to human populations who depend on these animal resources for nutrition. Of all public health risk factors, malnutrition is the single largest contributor to the global burden of disease—accounting for 1/3 of the entire burden of disease in poor countries. In addition to undernutrition (inadequate caloric intake), micronutrient deficiencies affect roughly 2 billion people globally and disproportionately impact children and pregnant women. Wildlife from aquatic and terrestrial ecosystems is a critical source of calories and micronutrients like iron and zinc for more than a billion people in economically developing countries. Conservation strategies to maintain robust populations of these animals, therefore, are not only a critical biodiversity conservation priority, but would also pay significant public health dividends.

One of the important issues that came up in discussion following this presentation related more to the issues Dr. Golden raised surrounding the dilution effect. There appeared to be a general misunderstanding of the relationship between biodiversity and disease emergence. Dr. Golden noted the importance of the (albeit idiosyncratic) role of biodiversity in minimizing community disease competence and how land-use change could drive trophic cascades that could lead to disproportionate disease emergence. This pattern has been documented, although it is not without a multitude of exceptions. However, it was argued that the key is not to view individual species as vectors for disease and thus conflate that risk with a risk that "biodiversity" per se could present to human health.

3. Biodiversity, One Health and Zoonotic Disease
Presented by: Dr. Elizabeth VanWormer

Zoonotic pathogens account for the majority of emerging infectious diseases in people, and more than 75% of these pathogens originate from wildlife. Recent human population growth and land use change has rapidly increased the number of people living in close contact with wild animals. Recognizing the critical linkages between human health and biodiversity, the University of California, Davis One Health Institute team has built long-term partnerships with stakeholders in Tanzania, Uganda, and Rwanda to address emerging zoonotic disease challenges at the human-animal-environment interface.

In Tanzania, the Health for Animals and Livelihood Improvement (HALI) project responds to the critical need for increased understanding of the impact of zoonotic disease on the health and livelihoods of people sharing resources with wildlife and livestock in the biologically diverse Ruaha ecosystem. The first phase of the HALI project addressed risk of zoonotic disease transmission in water-limited communities bordering protected areas. Recent efforts to expand our One Health approach include broader research on the impact of environmental change on zoonotic disease in people, livestock, and wildlife. Addressing the effects of emerging and existing zoonotic disease transmission through research, outreach and capacity building is strengthening conservation and public health in Tanzania. In East Africa and 17 additional countries throughout the world, the One Health Institute-led PREDICT program is building global wildlife surveillance networks to identify emerging zoonotic viruses with pandemic potential. The active sampling of bats, rodents, and primates to understand the risk of zoonotic disease transmission at human-wildlife interfaces was discussed. It was noted that zoonotic diseases from wildlife and domestic animals can impact people locally and globally, but human pathogens also pose a significant threat to wildlife species, like endangered wild mountain gorillas.

Gorilla Doctors was one of the first conservation programs to institute an employee health program (EHP) in order to safeguard the health of an endangered species in the wild. Since 2001, in addition to its work to treat ill and injured human-habituated mountain and Grauer's gorillas in the wild, Gorilla Doctors has provided annual health screening and health education to conservation workers: veterinarians, researchers, and hundreds of park trackers, porters, guides, and wardens, and to their families. As well, quarterly de-worming and hygiene education has been delivered to park workers'

children. For these men and women, the Gorilla Doctors' EHP has made a significant improvement in their level of health care. An integrated One Health approach to zoonotic disease research, capacity-building, and outreach enhances our ability to protect biodiversity as well as human, animal, and environmental health.

Full presentation available at
http://www.cbd.int/getattachment/health/africa/presentations/maputo_zoonotic_vanwormer.pdf

4. A One Health Approach to Transfrontier Conservation – the great Limpopo TFCA
Presented by: Dr. Clara Bocchino and Dr. Michael Murphree

Land-uses across transfrontier conservation areas (TFCAs) in southern Africa vary from fully protected national parks to highly intensive agro-industries based on irrigation. Within this mix are traditional villages and communal lands with livelihood strategies that often include livestock keeping. Such a landscape scenario poses a great number of challenges in how a TFCA is managed, especially in terms of transboundary disease control. The goal should be to successfully reconcile human development objectives, including addressing health issues, within the context of biodiversity conservation. Important dimensions of the development of TFCAs include the issues around wild and domestic animal health, the sustainable delivery of ecosystem goods and services, and associated human health. It is at the interface between wild animals, domestic animals and people and their livelihoods, within and outside protected areas, that these issues are at their most acute.

The complexities of this interface generate the need for a different paradigm in order to successfully address health and disease issues, and promote good environmental stewardship. Using a One Health approach, which operates holistically and considers ecosystems, wildlife, people and their livelihoods in the context of health, may provide the best chance to successfully promote human well-being and reduce poverty, whilst supporting conservation goals. It was noted that the AHEAD (Animal & Human Health for the Environment And Development) Program is working with partners to address problems facing biodiversity conservation and development in these large, transboundary landscapes across southern Africa. The program focuses on the important linkages between wildlife health, domestic animal health, and human health and livelihoods. While many critical issues exist at this interface, in terms of livelihoods and poverty reduction, the issue of transboundary diseases and their control stands out.

Full presentation available at:
http://www.cbd.int/getattachment/health/africa/presentations/maputo_ahead_murphree.pdf

Traditional Medicine

5. Traditional Medicine and Indigenous Knowledge

Presented by: Dr. Sekagya Yahaya

Indigenous knowledge and local communities have much to contribute to the sustainable management of resources, given the dependency of these communities on biological diversity and the unique role of indigenous and local communities in conserving life on Earth. These communities have a long history of sustainable use of biodiversity transmitting their knowledge, which has also been the foundation of their cultural and spiritual identities for generations. Knowledge about the use of specific plants and their healing and therapeutic attributes for treating diseases has mostly been passed down from generation to generation by oral tradition.

In rural Uganda, as in many other parts of Africa, there is very little medical coverage from practitioners of Western medicine. For instance, in the Mpigi District, a single doctor serves some 250,000 people where there is about one traditional healer per 187 people, making traditional medicine instrumental in the provision of basic health services and treatments for these communities. Dr Yahaya's

presentation emphasized traditional medical knowledge and practices as a means for improved health through mutual cooperation amongst health systems, in line with PROMETRA International's objectives, an international NGO with 27 chapters worldwide including 15 in different parts of Africa. Examples of Prometra Uganda's work were used to highlight synergies between biodiversity and traditional medicine and its contributions to human health.

It was noted that traditional medicine has its own rationale, logic, and system and it cannot be evaluated in strictly scientific terms as it has both material and non-material components. It was argued that traditional medicine takes into account the physical, psychological, ethical and spiritual dimensions of the human being, and thereby cannot be reduced to pharmacopoeia alone. In fact, from an indigenous perspective, biological diversity cannot be disassociated from cultural diversity. The promotion and protection of biological and cultural diversity is also a unique opportunity for cross-sectoral collaboration. Moreover, for these communities the Earth offers not only a livelihood, but is also the foundation of their cultural and spiritual identities. Several examples of the linkages between the use of different components of biodiversity and their application to human health and well-being were provided and strategies for strengthening traditional medicine proposed including, for example, supporting appropriate research and non-pharmacological approaches of the traditional health care system.

Full presentation available at:

http://www.cbd.int/getattachment/health/africa/presentations/maputo_traditionalmed_sekagya.pdf

Water & food systems from a Gender Perspective

6. Mainstreaming Gender

Presented by: Dr. Chimwemwe Ganje Mawaya

There are gender differences in terms of access, use, control/ownership and management of biodiversity and the ecosystem services that the biodiversity provides as a result of different gender roles that are mostly shaped by culture, values and norms. These differences also result in differential impacts on the different gender groups when there is loss of biodiversity and the ecosystem services they provide, especially those essential services relating to water, contribution towards health, livelihoods and well being. In many cases, there are differential health impacts as a result of impacts on food systems which results in malnutrition for women and children as well as loss of disease regulation which results in emergence of disease from ecosystem degradation, often with greater impacts on women because of their roles as gatherers, collectors and agricultural producers in the home.

The presentation provided examples on how differential health impacts arise based on gender: for example, if there is more economic exploitation of fisheries by men and a fishery collapses, women and children who are the most vulnerable populations, also lose their main source of cheap and affordable animal protein which may result in malnutrition; while deforestation can lead to an increase in emergence of disease and vector-borne diseases with strong repercussions on women in particular because of their gender roles and responsibilities e.g. gatherers of food and firewood and farmers being at greater risk because of increased contact with disease causing organisms or vectors.

It was noted that many countries in the African region have developed NBSAPs and means of implementing these strategies but without a deep understanding how the public health of the different gender groups are linked to biodiversity conservation and management. There is need therefore to develop NBSAPs that link gender health and biodiversity, especially in relation to water and food systems so that negative impacts on biodiversity loss and consequently negative gender health repercussions can be minimised. In addition, incorporating and promoting innovative gender sensitive strategies within NBSAPs can ensure that both men and women health issues are taken into account in sustainable use and conservation of biological diversity. Men and women interact differently with biodiversity and dependency of their health on biodiversity presents the men and women with different opportunities to sustainably use and conserve biodiversity.

Full presentation available at:

http://www.cbd.int/getattachment/health/africa/presentations/maputo_gender_chimwemwe.pdf

7. Mainstreaming Biodiversity Conservation and Sustainable Use for Improved Human Nutrition and Well Being: The case of Kenya
Presented by: Dr. Victor Wasike

As part of its work on agricultural biodiversity, the Convention on Biological Diversity (CBD) developed a Cross-cutting Initiative on Biodiversity for Food and Nutrition at COP8 in Brazil in 2006, which seeks to improve the evidence base for the nutritional value of biodiversity and its link to dietary diversity and improved human health. The recently commenced multi-country Global Environment Facility (GEF) funded project, *Biodiversity for Food and Nutrition* (BFN Project), is an important vehicle for implementation of the CBD's cross-cutting initiative. The project objective and outputs support the achievement of many of the goals and targets of the CBD Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets. The project is led by Kenya, Brazil, Sri Lanka and Turkey and coordinated by Bioversity International, with implementation support from the United Nations Environment Program (UNEP) and the Food and Agriculture Organization of the United Nations (FAO) and brings together a significant platform of global and national partners to strengthen partnerships, networking and capacity to enhance cross-sectoral biodiversity and health linkages, policy-making and broader mainstreaming. The project supports biodiversity conservation and use for improved human nutrition and well-being by enabling planners, policy-makers and practitioners from agriculture, health and environment sectors to work together using innovative approaches to strengthen the knowledge base for biodiversity and health, and to mainstream locally important but neglected food crops and wild species into local, national and global food and nutrition security strategies and programmes, including integration into National Biodiversity Strategies and Action Plans (NBSAPs).

Kenya, like the other project participating countries, contains unique agricultural biodiversity that is nutritionally-rich and crucial to the world's food supply. However, the contribution this biodiversity currently makes to local food security and nutrition, especially in poor rural communities, is undervalued resulting in lost opportunities to reduce hunger and malnutrition. The BFN project in Kenya is addressing these issues by undertaking assessments of the availability and utilization of local nutritious biodiversity, including associated traditional knowledge, prioritizing specific nutritionally-rich biodiversity for wider promotion and mobilization, as well as undertaking the development of national information and database systems on locally nutritious foods, and the establishment of nutrition-sensitive value chains based on local biodiversity with market potential. The presentation focused on how the BFN project in Kenya is leveraging and collaborating with a diverse range of international and national partners and institutions to mainstream biodiversity conservation and sustainable use for improved nutrition and health, and how this might be sustained and scaled up to other countries in the WHO African region.

Full presentation available at:
http://www.cbd.int/getattachment/health/africa/presentations/maputo_nutrition_wasike.pdf

8. Water: Biodiversity and Health Interlinkages
Presented by: Dr. Daniel Buss

Water ecosystem services play a crucial role as a provisioning, regulating and cultural service essential to human health and well-being. A broad range of international case studies were discussed, as well as challenges and potential strategies and new approaches to engage a greater number of stakeholders in the management of ecosystem services, for example, with scientific & environmental education program, by involving a broad range of stakeholders in negotiations and empowering communities.

Dr. Buss also discussed the repercussions of the mismanagement of water resources on public health leading to an increase in waterborne diseases (such as cholera and hepatitis), or the potential of bioaccumulation. Gold-mining activities, for example, may also increase mercury and methyl-mercury in aquatic ecosystems. Once it is in these systems, it bioaccumulates in the fish food chain and may cause health problems to the human populations that consume the fish. However, he also addressed the potential negative repercussions of the health sector on ecosystems. For example, birth control pills or antidepressants in water systems can act as endocrine disruptors and cause cancerous tumours, birth defects, and other developmental disorders in wildlife. Dr. Buss also discussed Antibiotic Resistance Genes (ARG) noting that the use of antibiotics in hospitals and food production may generate ARG which may confer a bacteria to be considered multiresistant. Similarly, he discussed the emerging issues of health and biodiversity impacts in regards to nanoparticles and cyanotoxins. For example, regarding the latter, he noted that eutrophication might lead to cyanobacteria blooms in waters used for human consumption. Moreover, some species of cyanobacteria may produce toxins that affect the neuromuscular system, the liver and can be carcinogenic to vertebrates, including humans. The presentation concluded on strategies for the post-2015 development agenda noting the needs to define a new paradigm for fully integrating: health in sustainable development; health as an outcome of the three pillars of sustainable development, and health as a way of measuring progress towards sustainable.

Full presentation available at:
http://www.cbd.int/getattachment/health/africa/presentations/maputo_buss_water.pdf

Other Thematic presentations

9. The role of the World Organization for Animal Health (OIE) in support of safeguarded biodiversity: The need for good Governance for management of natural resources
Organization for Animal Health (OIE)
Presented by: Dr. Florencia Cipriano, OIE Deputy Regional Representative for Africa, Botswana

The World Organization for Animal Health (OIE) currently has 178 Member Countries worldwide who have access to a global network of 182 Reference Laboratories and 38 Collaborating Centres providing high quality expertise needed for rapid and accurate pathogen detection and characterization. The expertise from these centres covers a wide variety of subject areas and animal pathogens. Animal pathogens can impede communities from attaining the benefits of the full potential of natural resources (of terrestrial and aquatic animals origin including environment and water) compromising the quality of foodstuffs and food safety.

OIE objectives consistent with its mandate include: the development of science-based standards and guidelines on prevention, control and eradication of animal diseases; safe trade measures to harmonize policies related to disease risks at the interfaces wildlife-domestic animals-humans; ensuring the scientific excellence of information and advice by regular support and update of notification mechanisms of animal diseases through OIE Global Information Systems (WAHIS and WAHIS-wild); protecting animal health including wildlife and biodiversity; and continued development and updating of OIE strategies and policies on wildlife and biodiversity through the Scientific Commission, the Working group on wildlife Diseases, and OIE Reference Laboratories and Collaborating Centres. It is in view of protection of animal health and biodiversity that OIE conveyed the "Global Conference on Wildlife and Biodiversity focusing animal health and biodiversity", seeking concerted efforts among different stakeholders. It was argued that the OIE's mandate for improvement of animal health, veterinary public health and animal welfare worldwide through engagement with international organizations and particularly with Member Countries is a key for the protection of biodiversity. This is also one of the platforms where intersectoral collaboration between animal and human health and environmental health needs to be developed and strengthened under "One Health" initiatives. Under this approach, recent efforts to control emerging pandemics emphasized the need for enhanced collaboration to continue

reducing the risks of zoonotic potential including food borne diseases and severe animal diseases at its source. To this end, the OIE noted the critical need to continuously improve veterinary governance and its cooperation with public health managers.

Full presentation available at:
http://www.cbd.int/getattachment/health/africa/presentations/maputo_oie_cipriano.pdf

Annex III - SUMMARY OF ADDITIONAL KEY POINTS FROM COUNTRY PRESENTATIONS

***Note**: All country presentations can be accessed at http://www.cbd.int/en/health/africa/presentations*

Countries	**What joint actions could the health and biodiversity sectors take at the national level in order to develop policies and promote activities that try to achieve co-benefits for human health and biodiversity?**	**What would be the key elements for a joint human health and biodiversity action plan? At what scale (local, sub-national, national, regional and global) do you think that this would this be most effective?**	**What is needed, at the national and regional scales, in terms of research, capacity building and information dissemination for joint human health and biodiversity sector actions?**	**What actions for human health and biodiversity are needed as a matter of urgency (1 year); medium term (2- 5 years); and in the long term (6 – 8 years)?**
BOTSWANA	Botswana has ratified a number of multilateral agreements on health and environment including the CBD and the Libreville declaration. The MEAs that the Ministry of Environment, Wildlife and Tourism coordinates address climate change, drought and desertification, biological diversity and waste management.	It has various institutions & organizations of central & local government responsible for health and environmental issues, but none is explicitly mandated with strategic alliance for health & environment. There are no specific budget allocations for health and environment linkages and human resources and institutional capacity for the management of health and environment linkages remains a challenge.	Botswana does not have a specific research agenda for health and environment. While there is lack of a dedicated environmental surveillance system, some government ministries and other agencies routinely collect data on environment and health related parameters in accordance with their respective mandates. - A fragmented approach to environment and health often results in the duplication of efforts during implementation of frameworks and strategies, mainly due to the multiplicity of authorities which have conflicting and overlapping functions - there is an established online Environmental Information system (EIS) which is mainly a platform for Environmental Information dissemination. An Integrated Disease Surveillance and Response (IDSR) was adopted to transform the existing fragmented system for Disease surveillance into a multi-disease Integrated system to report on notifiable diseases. However, there is no specific linkage between the IDSR and the EIS. - Mainly due to lack of an institutional mandated which would coordinate the linkages between health and environment. - Ongoing research in environment & in health but none that consider the inter-linkages between the two.	-Despite the challenges alluded to in this presentation, Botswana has made commendable progress in the management of her health and environment - Key hindrances for further excellence is the fragmented approach to health and environment issues with improvements to policy planning and strategy, resource allocation and efficiency, capacity for relevant institutions, research information management monitoring and evaluation effective advocacy - continued commitment to the ideals of the Libreville Declaration and the CBD 2011-2020 Strategic Plan Botswana will be well positioned to realize her aspirations for a clean and safe environment and health for all.

BURKINA FASO	Establishing a multidisciplinary working group on health environment including biodiversity (while avoiding duplication) -Assessing the current situation on human health and biodiversity linkages (strengths, weaknesses and opportunities) -Establishing joint teams to disseminate information and raise awareness -Developing and implementing a joint human health and biodiversity action plan.	Key elements of a joint action plan need to include: - Principles of the Action Plan - Defining actors and their roles (development, implementation and monitoring and evaluation) - Main areas of the intervention plan - Financial mechanism - Follow-up and evaluation mechanism (ii) Need to consider more effective scale - The need for a national document - The operational plan would be achieved through the integration of local, municipal and regional concerns In all cases, the process of developing national, regional or local plans should be bottom-up and include participatory and inclusive approaches.	(i) Joint research initiatives - Identification of joint research themes (human health and biodiversity) -Facilitate access to finance for specialization on the topic human health and biodiversity (ii) Joint capacity-building activities Initiating continuous training for the staff in the field (form of motivation), as members of multidisciplinary outreach teams on human health and biodiversity (iii) Joint actions for the dissemination of information -Communication strategy to be included in Joint Action Plans	(i) Urgent Actions (1 year): • Establishment of a multidisciplinary working group (health human and environment) • Carrying out the analysis on the state of human health and biodiversity interlinkages; (ii) medium term (2-5 years): Development and implementation of the joint action plan on the interrelationships between human health and biodiversity (iii) Long-Term Actions (6-8 years) Assessment and focus of the action plan, as needed.
BURUNDI	Synergies of certain tools (Situation analysis and needs assessment (SANA), national action plans for water supply and sanitation systems, etc.) National Plan to Combat Neglected Tropical Diseases Cross-sectoral working groups Creation of National Policy Steering Committees (interministerial) for the implementation of national water and sanitation policies national workshop on health determinants			Priority actions: Development of the Action Plan for the implementation of SANA; Analysis of the concept sanitation in Burundi Analysis of the economic, social and environmental impact of hygiene and basic sanitation Analysis and development of strategies for the promotion of hygiene and basic sanitation
CAPE VERDE	No joint actions on biodiversity and health are taking place (only partnerships and protocols on environment and health)			Designing joint action plans, mutual integration of join actions in the biodiversity and health sectors, developing a SANA and integrating biodiversity and health considerations in the SANA, creating conditions for the implementation of the Libreville Declaration.

COMOROS	Establishment of a coordination mechanism for health research on biodiversity and climate change Identify risks to health and biodiversity associated with climate change; Strengthen core national capacities that enable health systems and biodiversity, prepare and respond effectively to the adverse effects of climate change; Facilitate the implementation of interventions in human health and the environment to manage the immediate and long-term risks due to climate change; Facilitate operational and applied research on local adaptation and solutions for health and biodiversity needs; Disseminate lessons learned and experiences from the Comoros to facilitate the implementation of adaptation strategies in other sectors	Capacity building on the basis of needs and gaps identified based on assessments Implementation of an integrated environmental and health monitoring Ensure increased awareness and social mobilization Intensification of public health interventions to interrupt the chain of transmission of vector-borne diseases and reduce the risk of contamination of water and airborne diseases	*Facilitate operational and applied research on local needs adapted to health / environment and solutions thereto; *Strengthen core national capacity to enable the health system Comoros prepare to face the threats from climate change on human health and to respond effectively to: a) Strengthen capacity of human resources in health / environmental level and provide appropriate financial and logistical b) Strengthen technical capacity of staff in charge of health and the environment c) Strengthen logistical capacity for the implementation of the Health and Environment Action Plans *Establishing an information and periodicals reports the effects of climate change on the health system in order to fill gaps	Short-term actions (1 year) 1 - The management of household waste and hazardous waste 2-Conducting trainings to examine biodiversity impacts / environmental health (2 - 3 year timeframe) 1 - Setting up an institutional mechanism for consultations on specific topics in health and environment in accordance with the Libreville Declaration 2-Strengthening the framework for cross-sectoral dialogue and exchange: the environment, agriculture, water, sanitation, energy, health, education, urban planning, employment, economics and finance, etc.. **Recommendations** include: strengthening intersectoral collaboration and communication to develop joint activities that support the implementation of the Strategic Plan for Biodiversity 2011-2020 and Aichi Biodiversity Targets; - Integrate human health and biodiversity linkages in updated national strategies and action plans and environmental health strategies - Implement international and comprehensive management and awareness raising projects with national and international organizations.

DRC	The process of revising and updating NBSAPs is an opportunity for the integration of health-related concerns; The presence of health sector representatives in the working group on the revision and updating of NBSAPs The implementation of a Thematic Group on environmental services which examines the issues of health and the implementation of Aichi Target 14 within the Working Group on the NBSAP	It is possible to have a joint (national or sub-national) action plan but it requires both a trigger and resources • The implementation of the Libreville Declaration may be a trigger; • The process of revising and updating NBSAPs can also be considered a trigger if the essential services it provides, that encourage ecosystem protection, and the connection between these services and human health, are clearly indicated.	• Identification and mapping of ecosystems that are particularly important to human health • Economic evaluation of ecosystems important to human health; • Supporting research focused on taxonomy for medicinal plants.	
KENYA (on the Libreville Declaration process)			Activities that are needed include: increased regional and national political commitment and support; greater political acceptance across ministries and agencies; multidisciplinary programs interagency corroboration between national and UN Agencies; Leadership and catalytic actions, and; Building on ongoing programmatic activities.	
GABON	• Understanding of the interrelationships between biodiversity, environment, human health, food, social welfare and economic development by the various stakeholders •Efficient operationalization of the national health and environment plans, with greater consideration of the effects of water and air on human health For example: - Fight against substandard housing as a source of diseases - improve waste management	A joint human health and biodiversity action plan should consider the Strategic Plan for Biodiversity and Aichi target 14 and the Libreville Declaration It should also include: an overall objective and strategy, 2 to 3 specific objectives and generic actions and it can be refined in the context of revising / updating NBSAPs	Research needs: - Develop tracking devices (observatory and/or health monitoring) - Establishment of research units for a systemic approach to disease Capacity building needs: - Human and financial resources, especially in areas identified as priorities - Funding research, scientific expertise, etc. Information/awareness raising needs: - Developing information tools (open access to scientific information, CEPA, etc.).	

GUINEE	• Analyzing the baseline situation in the area of health and biodiversity; • Identifying priority problems and carrying out a needs assessment; • Developing a joint action plan; • Implementing an integrated desktop analysis; • Conducting research on environmental risk factors.	• Training management staff in the health and biodiversity, • Creating and equipping a national or regional laboratory center for health and biodiversity research; • Establishing a database for health and biodiversity issues		Strategic areas in which cooperation is needed include: advocacy; policies; financial resources; legislative frameworks; intersectoral coordination; strengthening institutional capacity; and research.
GUINEA BISSAU	Risk assessment, environmental factors and the impact on population health protection of Wild Fauna and Flora - Reforestation and supply of Water Resources - Promote the creation of an observatory to monitor the interaction health and biodiversity Constituting an interdepartmental working group Participating in a sectoral analysis of surveillance data of each sector Participating n the development of standards, legislation on health and biodiversity.	Coordinator mandate legal structure Appropriate resources (material, financial, human) Monitoring and evaluation mechanism	Coordination (Sub Regional, Global, Central (country-level) Operational level (local and regional) more effective. What is needed is a Strict control of the recommendations suggested in the first questions	- Risk assessment - Preparation and adoption of standards regulations; - Creation of the Competent Authority for institutional coordination; - Strengthening and capacity building activities for operationalization of integrated environmental health surveillance and; -Establishment of laboratory networks for surveillance and response to emergencies and disasters linked to ambient - Development of an education program integrated environmental health and the environment; -Provision of databases on environmental risks to human health; - Monitoring and evaluation of national, regional and international initiatives - Observatory on health and biodiversity.

LESOTHO	Developing a Situational Analysis & Needs Assessment which also investigates biodiversity loss Incorporating biodiversity issues in the Lesotho's National Health Research Agenda. Examining sustainable use options Adaptation of strategies that promote indigenous knowledge Reviewing Lesotho's NBSAP to incorporate health considerations	Promoting community participation in knowledge acquisition and dissemination Strengthening national research institutions Establishing regional and global databases on biodiversity, climate change & health information & expertise Establishing and maintaining human health & biodiversity knowledge-management networks		Immediate term (1 year) Regulation of unsustainable harvesting of indigenous medicinal fauna & flora medium term (2- 5 years) Inventories on unauthorized over the counter medicinal concoctions at national level long term (6 – 8 years) Establishment of regional & global networks on the abuse of biodiversity
MADAGASCAR	Structure and mechanism of collaboration and mechanism for exchanging information under the "Human Health and Biodiversity" theme must be defined jointly with the Clearing-House Mechanism and REBIOMA (Réseau de la Biodiversité de Madagascar) are needed as well as a sustainable mechanism for allocating resources, and regulations must be compatible and complementary.	Determining the roles and responsibilities of each of the two sectors Determining the implementation mechanisms Carrying out monitoring and evaluation activities	Creation of database-specific electronic data in "biodiversity and human health," as an extension of "Human Health and Biodiversity" training in Universities Ongoing training in "Biodiversity and Human Health" Research reports in the development of policies, programs and strategies Facilitating dialogue between the two sectors for a common understanding of constraints	In the short term: Establishment of a "Human Health and Biodiversity" cluster Development of a joint "Human health and biodiversity" action plan Institutionalization of the National Commission on Biodiversity and integration of health sector in that committee. In the medium and long term: Leveraging existing institutions such as CHM and REBIOMA to create a new system incorporating the "Human Health and Biodiversity" considerations Providing training in "Human Health and Biodiversity" in Universities In the medium and long term: Carrying out an awareness and education campaign on the relationship between the "Human Health and Biodiversity" Carrying out research in "Human Health and Biodiversity".

MALAWI	There has been a good working relationship between environment and various sectors including the Ministry of Health on programmes that affect the sectors. For example, Malawi National State of Environment and Outlook Report of 2010 contains full chapter on health issues. Although Malawi is a signatory to the Libreville declaration, it has just begun to organize for the implementation of the joint action plan.	Actions that are urgently needed include: The Roadmap for the implementation of the joint action plan to be developed under the leadership of the Ministry of Health; Establishing a task team with some major sectors to steer the process of formulating the SANA and Joint Action Plan and developing the SANA to address issues under the Libreville Declaration.
MOZAMBIQUE		Priorities include completing the Law of Traditional Medicine; reviewing the NBSAP, including national targets, preparing a National Plan for implementation of the Libreville Declaration, and creating a short, medium and long-term integrated information system on biodiversity, environmental sanitation and diseases linked to environmental risk.

SAO TOME E PRINCIPE	◦ Creation of partnership between the health and the environment through technical and political engagement; ◦ Carrying out trainings on the implementation of the Strategic Plan for Biodiversity 2011-2020 and the Libreville Declaration; ◦ Identifying key needs and joint activities; ◦ Creation of a national network of health and biodiversity.	key elements should include: issues, purpose, objectives, activities and tasks; defining the main actors and their interactions; Funding mechanisms; Monitoring and evaluation mechanism; the level of intervention Regional level seems to be particularly important considering: The cross-border character of the fauna biodiversity; The migration of certain species and people; and the means and vectors of disease transmission (e.g.: air, water)	Research, capacity building and information dissemination: Identifying areas of research between the health and biodiversity sectors; Research on the valuation of biodiversity (ecological, economic, medical, cultural and aesthetic); Developing a communication strategy; Training of technical staff (health and environment), and; Creating a website for sharing and disseminating information.	Current collaborative mechanisms include: the creation of focal points for each environment and health; approval of a National Strategic Plan on Health and environment; Creating a multisectoral and multidisciplinary team composed of officials from the Ministries of Health, Agriculture and the Environment in order to follow up the implementation of the Stockholm Convention. Promoting further collaboration require: Definition of synergies between the respective sectors and operationalization of the Environmental Coordination; Main obstacles include setting priorities that are not always the same for both sectors and donors; Lack of government funding and leadership.
SENEGAL	Integrating the human dimension in the NBSAP process	Developing a national land-based pollution policy, drafting community legislation (e.g. ecosystem approach to health) and creating implementation mechanisms for national policies and legislation.		Implementing joint actions and setting up thematic working groups based on risk occurrence Implementing the PAG 2013-2017 CNR Revising and implementing the NBSAP.

SOUTH AFRICA	Establishment of national health and environment strategic & technical task team- various stakeholders. Develop SANA. Intersectoral collaboration in policy making-linking health and biodiversity. E.g. Different health and biodiversity sector ministries with different policies. Integration of objectives in health and biodiversity strategies- by different ministries. Identification of national priorities by task team Development of joint action plans for implementation, monitoring and evaluation. Partnership projects with neighboring countries on common health and biodiversity issues	Collaboration of health and biodiversity sector policies and objectives at all levels of government, between health and various biodiversity sector ministries. Local and provincial-partnerships in projects between health and various biodiversity sectors. Strengthening available resources (human & finance)- all levels Strengthening health biodiversity databases Local- community involvement. Information dissemination-using various medias- all levels Training and capacity building strengthening-all health and environment ministries and institutions Strengthening existing health and biodiversity sector structures e.g. NCCM, Water quality monitoring forum	Drafting of community law (using an ecosystem approach to health) and the implementation devices operating in the legislation and national policies.	Urgent –SANA conduction. - Policy and legislative framework reviews where necessary. - Intersectoral collaboration strengthening Threats -Overpopulation- resources depletion- ecologic degradation- strategic intervention. Medium term – Training and capacity building strengthening Long-term – sustainability plan on the implementation of action plans
SWAZILAND	Swaziland has not yet undertaken the SANA for the preparation of plans of joint action, however a multidisciplinary team has been identified and it includes the Ministry of health, the Swaziland Environment Authority, Meteorology department, the City Councils, University of Swaziland, the World Health Organization and Non-governmental Organizations. A budget has been provided by WHO to finalize the National Adaptation Plan and upon completion of the NAP, the SANA process will resume.		• There is a need to strengthen research institutions within the country for joint health and biodiversity sector actions such as the Malkens research station of the ministry of agriculture, the university of Swaziland • The Health Promotion Unit of the ministry of health need to be strengthened to in cooperate health and biodiversity issues in their agenda and activities • To build capacity at all levels e.g. community-level to promote biodiversity while maximizing health benefits	There is a need to strengthen existing structures at community and national levels in terms of skills development

UGANDA	◦ Strengthen coordination and collaboration and transboundary, research networks ◦ Strengthen systems for health and environment surveillance to identify and better manage risks ◦ Annual Joint Sector Reviews e.g. including one on Biodiversity & Human Health ◦ Review relevant policies, strategies and guidelines to include biodiversity and human health considerations	a joint action plan must integrate/address: Medicines derived from nature; Biodiversity and medical research; biodiversity and human infectious diseases from deforestation, bushmeat and disease transmission; biodiversity and food production including malnutrition and threats to crops from pests, and climate change.	Needs at the national and regional scales include the need to: integrate research and development in natural products value chain, zoonotic diseases, and public health; sensitize and advocate for sustainable utilization, use of natural medicines, and positive public health behavior at various levels of governance; Develop biodiversity and human health information education communication materials and disseminate them to the public, and; Build capacity (environmental health, products, public health) at regional, national, district and sub-national levels to better prevent and treat environment-related health problems.	◦ List priority medicinal plants for conservation at national level ◦ Include human health and biodiversity linkages target in NBSAP ◦ Strengthen government departments and parastatal bodies with relevant technical personnel ◦ Lobby funding for Implementation of the Libreville Declaration
ZAMBIA	Temporary as well as Permanent Human settlements are being managed using the same guidelines for Environmental pollution and health concerns, including EIA and monitoring. Strengthening the Health inspectorate for Urban and Rural areas in order to assess the risks and consequences of environmentally related health problems. Ensuring that all hospitals, public places and residential areas have appropriate sanitation and waste/effluent disposal systems. Integrated population and environmental education.	(i) nutrition: includes having access to quality nutrition services (beural of standards + nutrition commission of Zambia and food safety section of the environmental health dept.); (ii) prevention: including medicinal plants, selective pest/vector control; (iii) proper methods of disposing of effluent and sewage and water quality monitoring by MOH and MOHLG	(National Level) Research and capacity-building: local Universities/Colleges/Research Institutions through government are able to provide programs that produce graduates able enough to carry out research on biodiversity and health Information dissemination: There are major gaps in this area due to the lack of a national coordinating committee and sensitization programs using public media (Regional Level) Research and capacity-building: Regional Collaboration with other institutions; Harmonizing national policies/legislation and aligning them with regional policies and international health regulations e.g. SADC protocols on health of 2011-2015 Information dissemination: Holding national symposiums, international conferences and capacity-building workshops such as this one	short term need for sensitization /awareness campaigns medium term need to reduce deforestation as forests are source of medicinal plants long term needs for strategic plans/protocols

ZIMBABWE	Conduct a Situation and Needs Analysis to see where exactly we are as a nation Taskforce on health and environment To incorporate in the review of the National Biodiversity Strategy and Action Plan (NBSAP.) Identification of the biological species that have a benefit to human health.	Formulate a joint policy on human health and biodiversity Mainstreaming of health and biodiversity issues into the educational curricula Capacity building of existing structures to ensure biodiversity and health information is cascaded to the local or village level.	Coordinating board with a secretariat at national level with the responsibility of disseminating information, research and capacity building. Skills development to the existing National Institute of Health Research to ensure mainstreaming of the linkages of biodiversity and human health. Creation of a National Regulatory Framework with which ensures the sustainable utilization of biodiversity with health benefits and protect it from becoming extinct. A Declaration to harmonize the implementation of health and biodiversity issues Regional Framework to harmonize the implementation of Biodiversity and health instruments.	There is need for strengthening of existing and creation of new structures in terms of skills development. Technical and financial support Equip and support Institutions of research and laboratories

Annex IV

RESULTS OF GROUP EXERCISES DISCUSSING NATIONAL PERSPECTIVES

The questions provided to participants following the first series of thematic presentations were as follows:

From your country's perspective:

A) What are the positive impacts of biodiversity on human health, and how are these mediated?
B) What are the negative impacts of biodiversity on human health, and how are these mediated?
C) How can we maximize positive impacts and minimize negative impacts, including through the management of biodiversity and ecosystems
NB: Consider all relevant levels of biodiversity – species diversity (plants, animals, microbes, etc.) genetic diversity and ecosystem functioning and integrity

It was noted that "Biological diversity" means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

A summary of the main points raised during the group discussions is provided herein.

i) Positive impacts of biodiversity on health[2] identified during discussions includes:

- Clean air, safe water, food (e.g., pollution control – mangroves, wetlands, plants, carbon cycle, water purification, erosion prevention)
- System Resiliency- continued production of services (e.g. biodiversity components are able to withstand stressors)
- Biodiversity attributes may allow communities to adapt to change (e.g. climate change, regulatory changes – identify alternatives – fish).
- Oxygen/air quality e.g., plants – oxygen, water purification
- Food production – system resiliency, soil nitrification, hydrological cycle,
- Source of energy e.g. fire
- Herbal derived medicines, nutrition (food), building materials (e.g., building poles, thatch)
- Pollination services
- Food and Nutrition
- Medicine
- Timber
- Gene pool for crop improvement
- Improves mental health
- Financial income
- Clean water (some plants filter water)
- Carbon sequestration
- Oxygen production
- Services provided by biodiversity:
    - Exploitation of medicinal species
    - Food sources (honey, animals, fruits, etc.)
    - Conservation of species that eat rodents or pests
    - Protection of agricultural products
- Protection against disease

[2] One group of participants noted that the range of benefits from biodiversity examined included 1) support functions and 2) regulatory services.

- Benefits of intact forest:
    - fluidity of water
    - Protection against diarrheal and other diseases
    - Air purification
- Contribution to the physical well-being
    - Pharmacopoeia (MTA)
    - Food / Nutrition
- Contribution to the mental well-being
    - Housing
    - Spirituality
    - Reduction of stress
- Institutional strengthening e.g.: Direction Community health and traditional medicine;
- Protection and conservation of endemic ecosystems in protected areas
- Promotion of research - Knowledge of potential medical breakthroughs (research centre for the study of endemic plants and birds with medicinal potential)
- Increased knowledge on medicinal plants and development of programs promoting traditional medicine
- Protection and conservation of ecosystem services essential to human survival
- Implementation of programs for traditional plants and strategies for traditional medicine
- Technical collaboration between the two sectors
- Education and community awareness for conservation of biodiversity
- Healers associations established by law for the protection of biodiversity

ii) Negative impacts of biodiversity on health identified during discussions include:

- Increase wildlife populations -zoonotic disease transmission potential increased
- Increased vector habitat – e.g., wetlands
- Human wildlife conflict increases (nutrition, loss life, gender impacts difficult to go into the bush)
- Land use conflict- protected areas- people want land for residence and farms
- Access to biodiversity becomes too regulated- essential services not available (nutrition, traditional medicine, energy)
- Toxic plants
- Disease /zoonotic and vectors
- Invasive species
- Reduce food production-Pests (quelea, army worms, locusts, etc.)
- Erosion, water pollution, diarrheal diseases
- Loss of endemic species
- Inappropriate use and dosing of medicines derived from nature
- Natural competition between domestic species, wildlife and humans
- Human /wildlife conflict:
    - Human injuries and deaths
    - Destruction of crops
    - Predation pets
    - Competition
- Overexploitation of endemic biodiversity

iii) Options to minimize negative impacts and maximize benefits identified during the workshop include:

- Sustainable use strategy development (include communities in the process!!!)
- Community participation in processes, develop local ownership
- Balance between use and preservation
- Balance between health needs and biodiversity needs
- Education and capacity development at multiple levels
- Identify equitable benefit sharing (gender, vulnerable groups)
- Economic and social incentives for ecosystem restoration (herbal, indigenous nurseries seed banks, small scale – large scale, Communities to Government (in situ – ex situ action)
- Securing benefits to local communities that bear cost.
- Health strategy development focused on system health
- Enforce legislation, mechanisms and procedures that facilitate positive impacts on biodiversity
- Mainstream biodiversity in community activities (health and nutrition)
- Creating awareness of benefits of biodiversity
- Enforce legislation, mechanisms and procedures that facilitate positive impact on biodiversity
- Strengthen traditional systems that positively impact on biodiversity.
- Awareness /education and training
- Strengthen management systems
- Extending protected areas
- Information and advocacy geared toward decision makers:
    - To foster a sense of ownership on linkages between the two sectors
    - To foster a common vision
- Creation of multidisciplinary structures (e.g. Coordinating Committee for One Health Approach)
- Creation of structures responsible for traditional medicine
- Development of National strategies and action plans favouring the promotion and development of NTFPs
- Developing national health plans that consider traditional medicine
- Integrate joint human health /biodiversity considerations in NBSAPS and National Health Development Plans.
- Conducting research to increase knowledge of vectors and their biology, and knowledge of human impacts on the vectors
- Implementing vector control strategies
- Implementing measures to reduce invasive species such as:
    - Increasing knowledge of the taxonomy of the species
    - Improving border control
    - Biological and chemical control,
    - Developing, updating and implementing legislation to regulate the spread of invasive species
- Developing national strategies to reduce human/wildlife conflict
- Fostering research
- Strengthening conservation in situ conservation and participatory approaches
- Strengthening institutional and community capacity
- Mobilizing financial resources

Appendix I

MAPUTO WORKSHOP PROGRAMME

Day 1 Tuesday 2 April

08:30 *Registration*

09:00 **1: Opening of the Workshop**

Convention on Biological Diversity

Oswaldo Cruz Foundation (FIOCRUZ)

World Health Organization

Government of Mozambique (Permanent Secretary)

09:20 **2: Workshop objectives and expected outcomes**

Introductions of participants and brief discussion

09:50 *Group photograph and Coffee Break*

10:30 **3: Advancing co-benefits between health and biodiversity and moving towards collaborative best practices: Introductory presentations**

(a) Interlinkages between biodiversity and human health (Dr. Carlos Corvalán, PAHO/WHO)

(b) The Strategic Plan for Biodiversity 2011-2020 & the Aichi Biodiversity Targets (Mr David Cooper, CBD)

(c) The Libreville Declaration (Dr. Lucien Manga, WHO Africa)

General Discussion

12:30 Lunch

14:00 **4: Integrating health and biodiversity policies with National Biodiversity Strategies and Action Plans (NBSAPs) and National Plans of Joint Action (NPJAs) for the implementation of the Libreville Declaration**

Presentations by country teams (10 min. per country)

The Republic of Seychelles, Burkina Faso, Swaziland, DRC

Questions and Answers

15:30 Tea break

16:00 Item 4 Continued

17:30 *Close of day 1.*

Day 2 Wednesday 3 April

0900 Feedback: “Catch of the day” and feedback on workshop organization

5: Opportunities and Challenges for key biodiversity and public health issues:

09:30 Presentation: Dr. Kathleen Alexander (CARACAL)

10:00 Presentation: Dr. Clara Bocchino and Dr. Micheal Murphree (AHEAD)

10:30 *Tea Break*

11:00 Presentation: Dr. Elizabeth Van Wormer

11:30 Group discussion on country perspectives
12:30 *Lunch*
14:00 Reporting back of all groups
15:00 Presentation Dr. Christopher Golden (HEAL)
15:30 Presentation Dr. Victor Wasike (nutrition)
16:00 *Tea break*
16:20 Presentation on Libreville Declaration by Dr. Ndegwe (WHO-Kenya)
17:00 Country team presentations (Mozambique, Kingdom of Lesotho)
17:30 Dr. Florencia Cipriano (OIE)
18:00 *Close of day 2.*

Day 3 Thursday 4 April

09:15 Feedback: "Catch of the day"

5: Opportunities and Challenges for key biodiversity and public health issues (continued)**:** Plenary

09:30 Presentation on Traditional Medicine, Mr. Sekagya
10:15 Presentation on Water by Daniel Buss
(Coffee break 11:00 - 11:15)
11:15 Presentation on Gender, Dr. Chimwemwe Ganje Mawaya
11:45 **4: Integrating health and biodiversity policies with National Biodiversity Strategies and Action Plans (NBSAPs) and National Plans of Joint Action (NPJAs) for the implementation of the Libreville Declaration**
Presentations by country teams and Group discussions (continued)
Country team presentations: Uganda, Zambia, République de Guinée, Malawi
12:30 *Lunch*
14:00 Country team presentations (continued): Gabon, Burundi, Madagascar, Botswana, South Africa, Zimbabwe, Guinea Bissau, Cape Verde, Sao Tome and Principe, Senegal and Comoros.
(Tea break 1530-1600)
16:00 Country team presentations (continued): Guinea-Conakry, South Africa and Equatorial Guinea.
1730 *Close of day 3.*

Day 4 Friday 5 April

07:00 Field study visit to *Ilha Portuguesa* Marine Reserve *(including presentation by Dr. Armando)*
12:30 Return to hotel and picnic lunch served on the boat
14:30 Arrival at hotel and tea break
15:00 **7. Discussion on conclusions of the workshop**
18:00 **8. Closing of the workshop**
