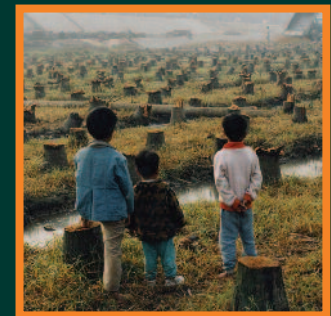




# Role of Biodiversity Healthy Ecosystems In Supporting Child Health



AMERICAN MUSEUM  
OF NATURAL HISTORY



Convention on  
Biological Diversity

*Equator*  
Initiative



MOUNT SINAI  
SCHOOL OF  
MEDICINE

# Background

The fundamental, yet often overlooked, dependence of child health and well-being upon healthy ecosystems (which provide clean water and air, food and medicine) and biodiversity (which makes possible these life-sustaining functions), motivated the organization of a special event specifically addressing these linkages. As a contribution to both the International Year of Biodiversity 2010 and the September 2010 United Nations Summit on accelerating progress towards the Millennium Development Goals (MDGs), the event highlighted the role of biodiversity and healthy ecosystems in underpinning progress on meeting MDG 4 on reducing child mortality, and related internationally agreed development goals supporting child health and well-being.



This brochure distills the key messages that emerged from the event, in terms of the overall concepts, and through striking examples and inspiring ideas for using this knowledge to affect actions to achieve progress on both fronts. The programme for the event (held at NYC's American Museum of Natural History, 30 April 2010), with links to the presentations made by the speakers, and to relevant work of their organizations, is available at: [www.nyo.unep.org/biodiversity](http://www.nyo.unep.org/biodiversity).

A pod-cast is available at: [www.amnh.org/news/2010/05/podcast-childrens-health-ecosystems/](http://www.amnh.org/news/2010/05/podcast-childrens-health-ecosystems/).

## Biodiversity and healthy ecosystems underpin child health

Conserving biodiversity – the variety of life on Earth – is essential in order to sustain healthy ecosystems – dynamic complexes of plants, animals, micro-organisms and their non-living environment, of which humans are an integral part.

Biodiversity and healthy ecosystems underpin human health through innumerable goods and services they provide, such as: the provision of food, water, fibres, energy and medicines; the production of oxygen and purification of air and water; the regulation of climate, by storing carbon and controlling local rainfall; the moderation of weather extremes (such as floods and droughts) and their impacts; the regulation of disease-carrying organisms and decomposing of waste and detoxifying of pollution; the cycling of nutrients to support soil fertility and the pollination of crops and plants, and control of pests; and the provision of models to understand and address health issues. Biodiversity also provides cultural, aesthetic, spiritual, recreational and educational benefits, which are important for physical and mental health.

Biodiversity continues to be lost at a rate unprecedented in human history. These losses impoverish us, not just because they compromise the life-support systems we rely upon everyday, but also through a lost opportunity to experience the beauty of nature. Unless the rapid pace of such loss is reversed, children stand to inherit a biologically depleted world that may be ever more vulnerable to the stresses placed upon it from population growth and a warmer, and generally more unpredictable, climate. Climate change is likely to become the dominant driver of biodiversity loss by the end of the century.

No one is immune to the adverse impacts of biodiversity loss and degraded ecosystems. However, some are more acutely affected than others. Children stand out as the most vulnerable segment of society. Biodiversity loss compromises our ability to keep our children healthy and to treat childhood illness. Children are different from adults – they may be more vulnerable to environmental risks and exposures than adults because their bodily systems are still developing; they need to eat more, drink more and breathe more in proportion to their body size than adults; and their behaviour can expose them more to harmful chemicals and organisms. As such, they are more susceptible to the effects of under and malnourishment, polluted water and infectious diseases that may be unleashed as the web of life frays.

**The linkages between biodiversity and healthy ecosystems, and child health, are multiple and complex. Broadly, the main interfaces are:**

## Food

**Biodiversity plays a crucial role in child nutrition**, providing the plant, animal and microbial genetic resources for food production, and supporting diversified and balanced diets. Biodiversity provides essential ecosystem functions such as fertilizing the soil, recycling nutrients, regulating pests and disease, controlling erosion and pollinating many of our crops and trees. Child malnutrition is devastating because it contributes to over a third of child deaths in developing countries, and it cripples children's growth, renders them susceptible to disease, dulls their intellect, and saps productivity and perpetuates poverty.

## Water

**Ecosystems services provide and purify water – crucial for child health and survival.** Biodiversity maintains ecosystem services needed to sustain drinking water supplies, through the continuous recycling of water through the hydrological cycle. Ecosystems also play a significant role in purifying water, i.e. wetlands act as sponges filtering impurities from rainfall and runoff. Lack of safe water and sanitation is the world's single largest cause of illness; exacting an especially high toll on children, killing and sickening thousands of children every day, and leading to impoverishment and diminished opportunities for thousands more.

## Medicines

**Biodiversity provides a unique and irreplaceable source for medicines and advances in understanding disease**, thereby supporting child health. Plants, fungi, microbes and animals are the sources of novel molecules (e.g., our new antibiotics and anti-

cancer drugs) that form the basis for new medicines. Biodiversity also provides models with which to study health and disease.

## Disease

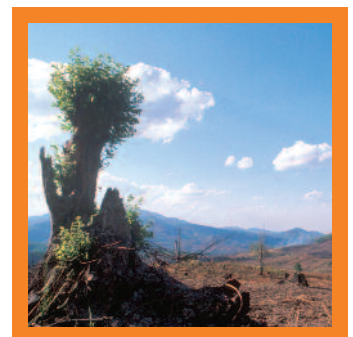
**Biodiversity loss, associated with habitat destruction, can increase the incidence and distribution of certain infectious diseases.** For example, ecological disruption, such as deforestation, has been associated with an increased risk of malaria, which disproportionately impacts children. Malaria is estimated to kill a child every 30 seconds, and contributes greatly to anaemia among children – a major cause of poor growth and development.

## Nature

**Experiencing and connecting with biodiversity positively influences physical and mental health and well-being.** Research on childhood exposure to nature suggests that early positive experiences in nature may have benefits across the lifespan, from reduced stress and greater self-confidence to higher achievement in school, better physical fitness and lower rates of obesity.

## Resilience

**Biodiversity is essential to reduce the vulnerability and increase the resilience of communities** in the face of shocks such as climate change and natural disasters. The loss of biodiversity destabilizes ecosystems and the services that they provide (such as climate regulation and flood mitigation), thereby weakening community resilience, and their ability to adapt and protect the health and safety of their children.



# Achieving co-benefits for biodiversity and child health

- Actions to conserve biodiversity and promote ecosystem management can have multiple benefits – for health, environment and development. For example:
  - Community-based sustainable management of Maya nut forests, in various Latin American countries, has demonstrated multiple positive and lasting impacts. Women, as caretakers of the family and the environment, are taught the high nutritional value of Maya nut, and learn to produce, consume and sell Maya nut products. This motivates them to conserve the rainforest biodiversity, plant trees and organize to produce and market Maya Nut products, so that they can earn income and improve the nutrition and health of their families. These efforts have enhanced rainforest conservation, reforestation, women’s incomes, self-esteem and status, food security, maternal and child health, and nutrition (including infant birth weights) – contributing to progress on multiple MDGs. Anecdotal evidence also suggests that children receiving Maya nut in their diets increase their learning gains in school, and have reduced incidences of childhood disease.
  - Improved stoves can reduce both indoor air pollution and the harvesting of trees, protecting forest biodiversity.
  - Integrated assessments looking at how communities see the link between ecosystem conservation and their own health can be used to achieve mutual benefits for health and biodiversity conservation. This requires listening to, and taking the lead from, communities. Starting with the community’s understanding of the links between deforestation, biodiversity loss, water shortages, poor crop yields and hunger and malnutrition – grassroots strategies to reach sustainable health and environmental management can be developed.
- There is a need to: (i) develop integrated tools and foster trans-disciplinary approaches that link biodiversity to human health; (ii) study environmentally-sensitive diseases in order to support more effective preventive public health strategies; and (iii) develop qualitative and quantitative research, involving decision-makers, that explores the root causes of disease emergence and addresses how anthropogenic drivers of changes in biodiversity affect the transmission of human disease. For example, efforts to explore the links between biodiversity and Lyme disease (the most common vector-borne disease in the United States, for which incidence rates are highest among children) are fostering interactions among ecologists, epidemiologists, geographers, urban/ suburban planners, and local and state government to discuss, plan and implement risk reduction strategies.
- The goals of public health professionals and conservationists are quite well aligned once the link between biodiversity and health is clearly understood. Advancing this kind of integrated understanding between health and biodiversity can help increase the integration of biodiversity issues in other policy areas.
- Helping people to understand what biodiversity loss means for them, particularly in terms of their health and that of their children, can be a very effective incentive for the positive behavioural change that is required to ensure more sustainable lifestyles, which will in turn ease threats to biodiversity.
- While understanding the urgency of the challenge, children must be imbued with optimism and a conviction that it is not too late to act, and that working together can overcome these challenges. Children should be enabled to take action in conservation activities. For example, children can plant locally important - ideally indigenous - tree species in or near their schoolyard.
- At the individual and community levels actions should stem from a focus on drivers of biodiversity loss and ecosystem degradation such as taking action to make more sustainable choices in energy, food and water consumption