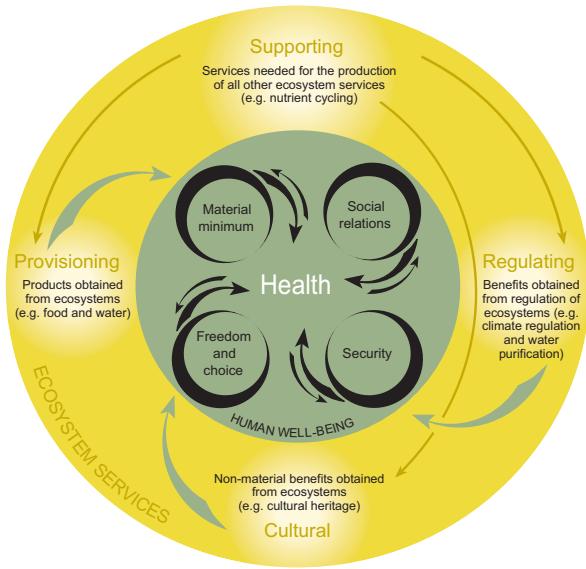


Ecosystems and Human Health:

some findings from the Millennium Ecosystem Assessment

WHY DO ECOSYSTEMS MATTER TO HUMAN HEALTH?



In a very fundamental sense, ecosystems are the planet's life-support systems - for the human species and for all other forms of life. The needs of human biology for food, water, clean air, shelter and relative climatic constancy are basic and unalterable.

Ecosystem services are indispensable to the well-being of all people, everywhere in the world. The causal links between environmental change and human health are complex because they are often indirect, displaced in space and time, and dependent on a number of modifying forces (Figure 1).

Figure 1. Interrelationship between ecosystem services, aspects of human well-being and human health.

ECOSYSTEM SERVICES AND HUMAN HEALTH

Food

In poor countries, especially in rural areas, the health of human populations is highly dependent upon the services of local productive ecosystems for food. Aggregate food production is currently sufficient to meet the needs of all, yet of the present world population of just over 6 billion, about 800 million are underfed with protein and/or energy, while a similar number are overfed. At least an additional billion people experience chronic micronutrient deficiency. In richer urban communities human dependence on ecosystems for nourishment is less apparent, but ultimately no less fundamental.

Fresh water

Over 1 billion people lack access to safe water supplies, while 2.6 billion people lack adequate sanitation. This has led to widespread microbial contamination of drinking water. Water-associated infectious diseases claim up to 3.2 million lives each year, approximately 6% of all deaths globally. The burden of disease from inadequate water, sanitation, and hygiene totals 1.8 million deaths and the loss of greater than 75 million healthy life years. It is well established that investments in safe drinking water and improved sanitation show a close correspondence with improvement in human health and economic productivity. Each person needs 20 to 50 liters of water free of harmful chemical and microbial contaminants each day for drinking and hygiene. There remain substantial challenges to providing this basic service to large segments of the human population.

Fuel

The generation of power causes a range of health impacts. Outdoor air pollution aggravates heart and lung disease. Indoor air pollution, most typically from the combustion of biofuel in poorly ventilated heating and cooking environments causes a major burden of respiratory diseases amongst adults and children. About 3% of the global burden of disease has been attributed to indoor air pollution from this source. In areas where the demand for wood has surpassed local supply, and where people cannot afford other forms of power, there is increased vulnerability to illness and malnutrition from consuming microbiologically-contaminated water, from exposure to cold, and from a lack of properly cooked food. Poor women and children in rural communities are often the most affected by wood fuel scarcity. Many must walk long distances searching and carrying firewood (and often, water) and therefore have less time and energy for tending crops, cooking meals or attending school. For these reasons, adequate energy supplies are fundamental for sustainable development.

Nutrient and waste management, processing and detoxification

Humans are at risk from inorganic chemicals and from persistent organic pollutants in food and water. This can occur both when attempts to access water resources leads to contamination from natural sources (as occurred with arsenic contamination of water in tubewells in Bangladesh), and where human actions result in release of toxic chemicals into the environment (for example through use of pesticides). Toxic chemicals can cause a variety of adverse health effects in various organ systems. Some chemicals present in industrial effluent or used as pesticides, such as PCBs, dioxins and DDT, may act at low exposure levels as “endocrine disrupters” which interfere with normal human physiology, undermining disease resistance and reproduction.

Cultural, spiritual and recreational services from ecosystems

Cultural services may be less tangible than material services, but are nonetheless highly valued by people in all societies. People obtain diverse non-material benefits from ecosystems. They include recreational facilities and tourism, aesthetic appreciation, inspiration, a sense of place and educational value. There are traditional practices linked to ecosystem services that have an important role in developing social capital and enhancing social well being.

Climate regulation

Each of the ecosystem services referred to in the previous sections is sensitive to climate, and will therefore be affected by anthropogenic climate change. Although climate change will have some beneficial effects on human health, most effects are expected to be negative. Direct effects such as increased mortality from heat waves are most readily predicted, but indirect effects are likely to have a greater overall impact. Human health is likely to be impacted indirectly by climate-induced changes in the distribution of productive ecosystems, and the availability of food, water and energy supplies. These changes will in turn affect the distribution of infectious diseases, nutritional status and patterns of human settlement.

WHAT ACTIONS ARE REQUIRED TO ADDRESS THE CONSEQUENCES OF ECOSYSTEM CHANGE FOR HEALTH?

There are two routes to avoiding disease and injury caused by ecosystem disruption. One is to prevent, limit or manage environmental damage; the other way is to make whatever changes will protect individuals and populations from the consequences of ecosystem change. Two aspects need to be considered to understand the potential negative health impacts of ecosystem change: the current (and likely future) vulnerability of populations and their future capacity for adaptation. These two aspects are closely related. The forces that place populations at risk (such as poverty and high burdens of disease) in many cases also impair the capacity of these populations to prepare for the future.

WHAT ARE THE POLICY IMPLICATIONS OF THE THREATS THAT ECOSYSTEM CHANGE PRESENT TO HEALTH?

Measures to ensure ecological sustainability would safeguard ecosystem services and therefore benefit health in the long-term. Where a population is weighed down by disease related to poverty and lack of ‘entitlement’ — culturally or socially determined right of access to essential resources such as shelter, nutritious food or clean water — the provision of these resources should be the first priority for public health policy. Where ill-health is caused, directly or indirectly, by excessive consumption of ecosystem services (such as food and energy) substantial reductions in consumption would have major health benefits while simultaneously reducing pressure on life-support systems.

The ongoing degradation of ecosystem services is a significant barrier to achieving the Millennium Development Goals. Ecologically unsustainable use of ecosystem services raises the potential for serious and irreversible ecological change. Ecosystem changes may occur on such a large scale as to have a catastrophic effect upon the economic, social and political processes upon which social stability, human wellbeing and good health are dependent. This suggests that a precautionary approach to environmental protection is most likely to protect and enhance health. Unavoidable uncertainties about the impacts of global environmental changes on public health should not be an excuse for delaying policy decisions.