



ECOSYSTEMS AND HUMAN WELL-BEING

*Opportunities and Challenges
for Business and Industry*



MILLENNIUM ECOSYSTEM ASSESSMENT



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A Report of the Millennium Ecosystem Assessment

The Millennium Ecosystem Assessment (MA) is a four-year international scientific assessment of the consequences of ecosystem change for human well-being. A multisectoral Board of Directors—consisting of senior representatives from government, business, NGOs, U.N. agencies, academia, and indigenous peoples—developed and managed the MA. The assessment was conducted by 1,360 natural and social scientists from 95 countries and was comprehensively peer-reviewed by an additional 600 experts. It provides a state-of-the-art scientific appraisal of the condition and trends in the world's ecosystems and the services they provide (such as clean water, food, forest products, flood control, and natural resources). The assessment also analyzed options to restore, conserve, or enhance the sustainable use of ecosystems and their contributions to human well-being. Financial support for the MA was provided by a variety of governments, institutions, and foundations around the world.

This report synthesizes the take-home messages of the MA for the business community throughout the industrial and developing world. It begins by highlighting key MA findings with particular relevance for businesses large and small. The report then provides an interpretation of the significance of these findings for business and industry, including a checklist of questions designed to help tailor the general findings of the MA to a particular business.

This report was prepared by a panel of assessment authors and representatives of businesses and partner organizations, academic experts, and members of the NGO community. It provides a portal for businesses into the Millennium Ecosystem Assessment.

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1. *Why the Millennium Ecosystem Assessment Is Important for Business and Industry*

Businesses interact with ecosystems and ecosystem services in two important ways: they use services and they contribute to ecosystem change. The MA discovered that two thirds of the ecosystem services it examined are being degraded or used unsustainably. This finding has serious ramifications for the world at large and will affect business and industry in three principal ways.

1. **If current trends continue, ecosystem services that are freely available today will cease to be available or become more costly in the near future. Once internalized by primary industries, additional costs that result will be passed downstream to secondary and tertiary industries and will transform the operating environment of all businesses.**
2. **Loss of ecosystem services will also affect the framework conditions within which businesses operate, influencing customer preferences, stockholder expectations, regulatory regimes, governmental policies, employee well-being, and the availability of finance and insurance.**

“Business cannot function if ecosystems and the services they deliver—like water, biodiversity, fiber, food, and climate—are degraded or out of balance.” —World Business Council for Sustainable Development

3. **New business opportunities will emerge as demand grows for more efficient or different ways to use ecosystem services for mitigating impacts or to track or trade services.**

Business cannot assume that there will be ample warning of a change in the availability of key services or that a company’s past responses to changes will be successful in the future. Ecosystems often change in abrupt, unpredictable ways. Most ecosystems are being altered by human actions in unprecedented ways. Consequently, it is difficult to predict the future state of an ecosystem or the availability of an ecosystem service. In addition, these uncertainties mean that past successes in ecosystem management may not apply to current or future conditions.

“The solutions of the past are often not robust enough under the conditions of global change and need to be re-thought and re-implemented.” —Antony Burgmans, Chairman, Unilever N.V.

The MA provides a benchmark for public policy, public awareness, and the private sector; it will influence investments, the regulatory climate, and public opinion at national and international levels over the next 10 years. Using the findings of the MA can help ensure that a company’s ventures are informed by the best available scientific information. Factoring that information into plans will allow businesses to position themselves as innovators and market leaders. Failure to keep pace with these changes risks the loss of competitive advantage, brand reputation, and the license to operate, innovate, and grow.

Even though Earth’s natural capital is being eroded at a rapid rate, there is still time to lessen the impact and preserve options by building on a growing number of examples of good practice. The MA is designed to help decision-makers factor information about changes in ecosystems into their strategic planning. It provides a framework for the integrated management of multiple, interacting ecosystem services. The MA is the most comprehensive analysis to date of the many and complex ways in which people depend on and affect the natural environment.

“Businesses’ engagement in voluntary actions to reduce their impact on Earth’s ecosystems can be an engine of positive change in two ways: it can be a source of new opportunities for business, and a means of preserving our natural assets for future generations.” —Jonathan Lash, President World Resources Institute

2. The Bottom Line

People everywhere rely on ecosystems and the services they provide. So do businesses. Demand for these services is increasing. However, many of the world's ecosystems are in serious decline, and the continuing supply of critical ecosystem services is now in jeopardy.

The loss or degradation of ecosystem services will have impacts on human well-being. It will also profoundly affect businesses. Higher operating costs or reduced operating flexibility should be expected due to diminished or degraded resources (such as fresh water) or increased regulation.

Every threat creates opportunity. Innovation and technology to minimize the damage to ecosystems and to mitigate impacts already occurring are creating significant new business opportunities for those who are aware and prepared.

The impacts of ecosystem degradation will be felt over both the short term—the next 5 years—and the longer term—the

WHAT ARE ECOSYSTEMS AND ECOSYSTEM SERVICES?

An **ecosystem** is a dynamic complex of plants, animals, microbes, and physical environmental features that interact with one another. **Ecosystem services** are the benefits that humans obtain from ecosystems, and they are produced by interactions within the ecosystem. Ecosystems like forests, grasslands, mangroves, and urban areas provide different services to society. These include provisioning, regulating, and cultural services that directly affect people. They also include supporting services needed to maintain all other services. Some ecosystem services are local (provision of pollinators), others are regional (flood control or water purification), and still others are global (climate regulation). (See Figure 1.) Ecosystem services affect human well-being and all its components, including basic material needs such as food and shelter, individual health, security, good social relations, and freedom of choice and action. (See Figure 2.)

Figure 1. ECOSYSTEMS AND SOME SERVICES THEY PROVIDE

Different combinations of services are provided to humans from the ecosystems represented here. Their ability to deliver the services depends on complex biological, chemical, and physical interactions, which are in turn affected by human activities.

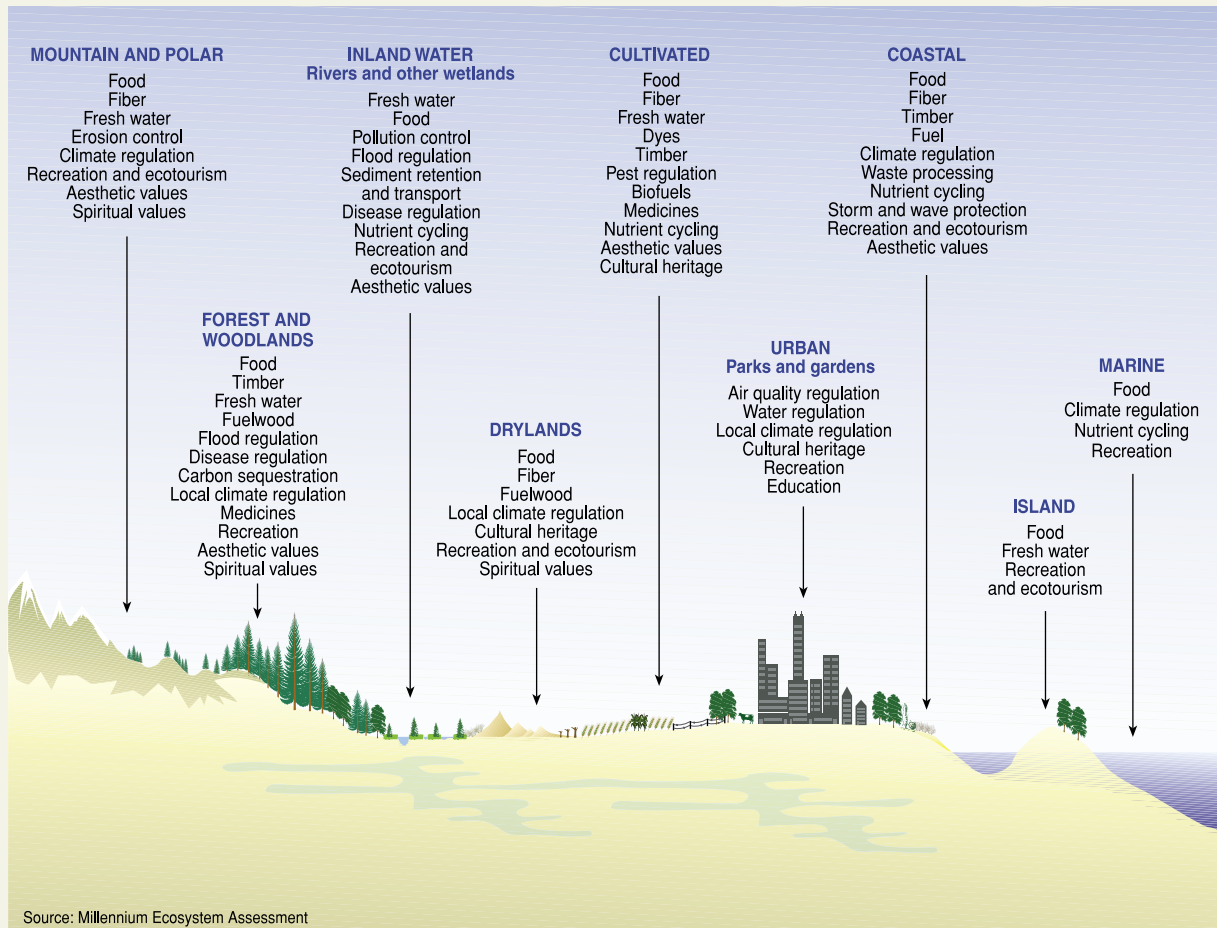
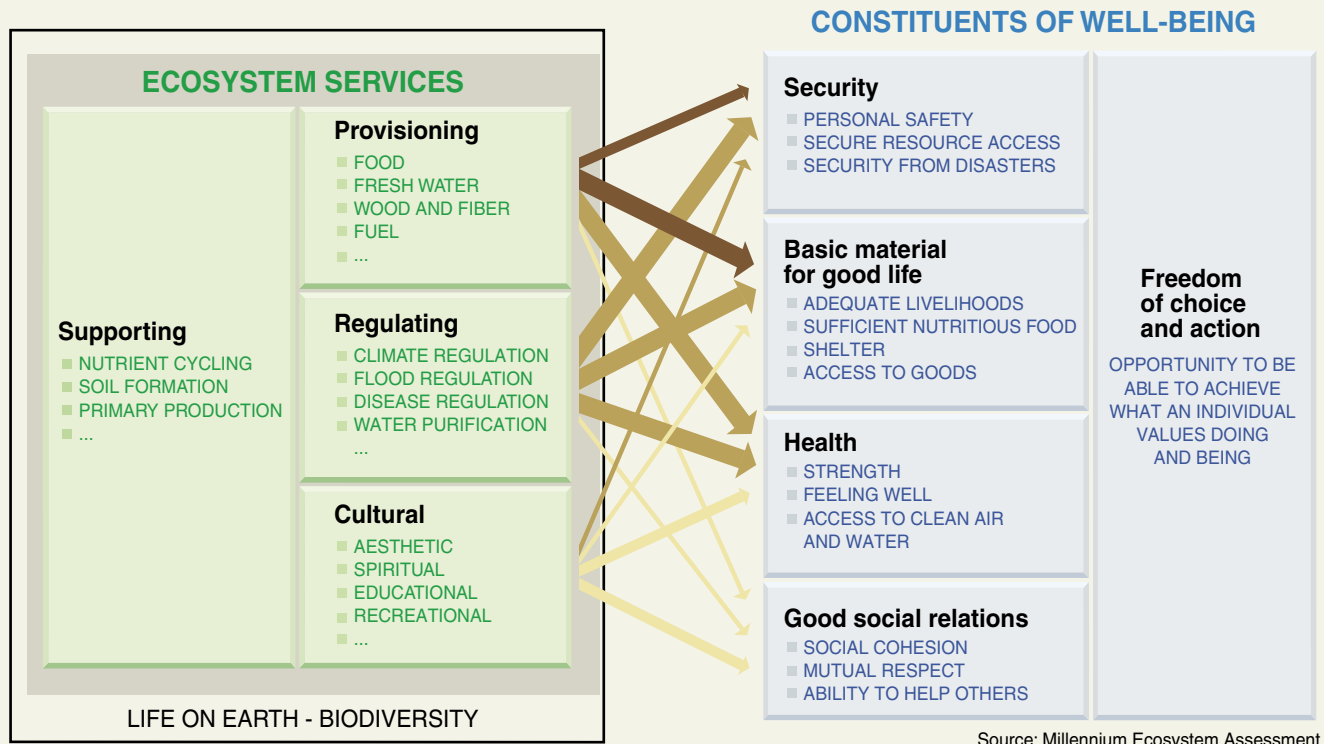


Figure 2. LINKAGES BETWEEN ECOSYSTEM SERVICES AND HUMAN WELL-BEING

This Figure depicts the strength of linkages between categories of ecosystem services and components of human well-being. It includes indications of the extent to which it is possible for socioeconomic factors to mediate the linkage. For example, if it is possible to purchase a substitute for a degraded ecosystem service, then there is a high potential for mediation. The strength of the linkages and the potential for mediation vary according to the specific ecosystem and region. In addition, other factors—including other environmental factors as well as economic, social, technological, and cultural factors—influence human well-being. Ecosystems are in turn affected by changes in human well-being.



ARROW'S COLOR Potential for mediation by socioeconomic factors	ARROW'S WIDTH Intensity of linkages between ecosystem services and human well-being
Low	Weak
Medium	Medium
High	Strong

next 50 years. But many businesses will experience an array of direct and indirect impacts immediately because ecosystem degradation is changing public policy, consumer preferences, supplier relationships, stockholder expectations, and competitor strategies, all of which vary by country and region of the world. Many governments, NGOs, and leading companies are already taking action.

Regardless of its focus, a business will be more competitive if it bases decisions about strategic direction, product offerings, production, transportation, and marketing on the best available

information about the current and projected condition of ecosystems and ecosystem services. The MA provides a framework for understanding ecosystem services and provides scientifically credible information about the important linkages between those services and human well-being.

As demands for the services provided by ecosystems grow and the ability of these systems to meet these demands is eroded, increasingly difficult challenges must be confronted. For example:

- How do we meet the growing demand for **food** (projected to increase by 70–80% in 50 years) without further harming the environment or the integrity of the food supply chain?

■ Given the unevenly distributed supply of **fresh water**, how do we meet agricultural, industrial, and consumptive needs around the world?

■ Given the expected increase in demands for energy, what are the most efficient and effective strategies to produce energy while also minimizing impacts to **air quality and climate**?

■ How do we balance conservation of **biodiversity** with opportunities for economic development associated with alteration or conversion of habitats?

■ How do we balance increasing demand for seafood and expanding opportunities for aquaculture, while promoting the health of fresh and coastal waters and restoring depleted **wild fisheries**?

Business is positioned to be a very positive force in addressing these challenges through pursuit of new business opportunities and markets, reduction of operational footprints, development and deployment of new technology, and establishment of effective partnerships. In addition, businesses can demonstrate leadership in support for and reform of public policy that seeks to raise industry environmental performance standards in order to gain first-mover advantages while improving the reputation of their industry as a whole with important customers and constituencies.

It is in business's self-interest to take a leadership role in **reducing poverty, improving human well-being, and protecting the environment**. Doing so will help secure stable and safe societies, preserve open and free markets, ensure access to critical resources, provide new product and business opportunities, avoid abrupt social and environmental changes, and, for the most astute and agile, **carve out competitive advantage**.

The MA outlines actions businesses can take that would improve their bottom line, reduce degradation of ecosystems, and benefit human well-being. These actions include:

■ **Identify and understand the ecosystem services** that a business uses or affects (including those important to suppliers, partners, customers, and other constituencies) and adjust corporate strategies accordingly.

■ **Manage in an integrated way** the interacting and multiple demands on ecosystem services throughout supply chains and product life-cycles.

■ **Increase efficiency of ecosystem-service use or ecosystem-service supply** by developing, deploying, or marketing new technologies that improve operations, reduce impacts on ecosystems, and meet increasing demand for ecosystem services.

■ **Pursue partnerships** with other companies, government agencies, and civil society organizations to help accelerate corporate learning about ecosystems and ecosystem services, leverage resources and skills, and build trust with important stakeholders.

■ Take business decisions that **anticipate growing customer preferences for sustainably supplied services, new regulations, competitor strategies, investor demands for sustainable business models, and the establishment of market mechanisms**.

For example:

- reduce carbon emissions,
- decrease nitrogen and phosphorus loading,
- increase efficiency of water and energy use,
- protect natural habitat and biodiversity,
- achieve the sustainable management of natural resources, and
- make decisions informed by the full “life-cycle” costs of products.

■ **Provide objective information** on the impact of operations on ecosystem services to key stakeholders (including the public) to build trust, help create a value-adding reputation, and help strengthen the business case for ecosystem conservation.

The MA provides a comprehensive analysis of ecosystem status and trends, options for action, and scenarios that explore the trade-offs to be confronted.

There are four components of the MA analysis:

■ **condition and trends** in ecosystems and services associated with human well-being;

■ **scenarios** of contrasting possible futures with respect to changes in ecosystem services;

■ **possible responses** by governments, nongovernmental organizations, and businesses to ecosystem changes; and

■ **sub-global assessments** that analyze the nested local, national, and regional scales at which ecosystems and human well-being are connected.

An overarching synthesis, MA Board Statement, and four additional reports that integrate MA findings concerning biodiversity, desertification, wetlands, and human health are also available.

3. What We Know

Key Trends in Ecosystems and Their Services

Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period in human history, largely to meet fast-growing demands for food, fresh water, timber, fiber, and fuel. The changes we have made to ecosystems have contributed to substantial net gains in human well-being and economic development. However, these gains have come at growing costs in the form of degradation of many ecosystem services (see Table 1), increased risks of abrupt and harmful changes in ecosystems, and harm to some groups of people.

Approximately 60% (15 out of 24) of the ecosystem services examined in this assessment are being degraded or used unsustainably—including 70% of provisioning and regulating services. While 15 services have been degraded, only 4 have been enhanced in the past 50 years, 3 of which involve food production: crops, livestock, and aquaculture.



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