

# FEATURE FOCUS

## Environment and Globalization

Minimizing risks, seizing opportunities



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# Environment and globalization: Minimizing risks, seizing opportunities

Globalization is helping to remove hundreds of millions of people from poverty and to provide cheaper goods for many. Yet it also carries great risks for excluded social groups and for the environment. To achieve a ‘sustainable globalization’ that seizes opportunities and minimizes risks, advances and innovations are needed in governance, civil society, finance, and business at every level from the local to the global.

## INTRODUCTION

Globalization in its many dimensions—economic, cultural, environmental, technological, and political—is widely recognized as a defining feature of our times. The United Nations Millennium Declaration, adopted by world leaders in 2000, stated that the central challenge the world now faces “is to ensure that globalization becomes a positive force for all the world’s people” (United Nations 2000). Two years later, participants at the World Summit on Sustainable Development (WSSD) in Johannesburg addressed the links between

globalization and sustainable development more specifically. They identified trade, investment, capital flows, and advances in technology as opportunities available through globalization. They also considered financial crises, insecurity, continuing ecosystem decline, poverty, socio-economic exclusion, and inequality within and among societies as serious challenges linked to globalization (United Nations 2002).

The challenge of ecosystem decline has become even more evident in subsequent years. The landmark findings of the Millennium Ecosystem Assessment

(MA), based on the collective work of over a thousand scientists from around the world, were released in 2005. The MA concluded that over the past half-century humans have altered ecosystems more rapidly and more extensively than in any comparable period of time in human history. The MA noted that while the changes made to ecosystems have contributed substantial net gains in human well-being, they have also led to growing costs, including the degradation of many ecosystem services. The MA concluded that given current trends, the degradation of ecosystem



Earth at Night (27 November 2000). The above image is a composite of hundreds of pictures made by the orbiting DMSP (Defense Meteorological Satellite Program) satellites—Earth Observation Group, National Geophysical Data Data Center, National Oceanographic and Atmospheric Administration (NOAA), USA.

Sources: C. Mayhew & R. Simmon (NASA/GSFC), NOAA/ NGDC, DMSP Digital Archive

services could grow significantly worse during the first half of this century. Importantly, the MA also noted that this degradation of ecosystem services is being borne disproportionately by the poor, is contributing to growing inequities and disparities across groups of people, and is sometimes a principal factor contributing to poverty and social conflict (MA 2005).

It is now well-established that today's multi-faceted globalization trends are intricately linked to both environmental quality and human well-being, and that they pose both large risks and great opportunities for sustainable development (Box 1). But as globalization spreads and deepens alongside growing evidence of serious damage to the world's ecosystems, with grave implications for human well-being, the need to improve our understanding of the complex interactions between these two powerful and converging trends is becoming increasingly urgent.

This Feature Focus seeks to illuminate the risks and the opportunities that globalization poses for efforts to protect the health of the environment, its ecosystems, and the well-being of all who depend on them. It also aims to identify strategies through which governments, international institutions, civil society, and the private sector can effectively work together to harness globalization trends for environmental sustainability and human well-being.



Delegates at the 2002 World Summit on Sustainable Development in Johannesburg identified challenges facing globalization and sustainable development components.

Source: AP Photo/Dario Lopez-Mills

### THE MANY FACES OF GLOBALIZATION

The globalization debate of the last few decades has stirred strong passions, with some observers focusing mainly on globalization's dangers and others heralding its benefits. The controversy stems in part from the

fact that 'globalization' means different things to different people. For the purposes of this discussion, we consider globalization to be a multifaceted phenomenon, and single out for special consideration its economic, technological, and political dimensions

#### Box 1: Environment and globalization: costs and benefits

Recent analysis of the environmental costs and benefits of globalization presents "at least eight reasons to suppose that globalization can exacerbate environmental problems":

- expansion of environmentally destructive growth;
- decrease in the ability of national governments to regulate and otherwise cope with environmental management challenges;
- increase in corporate power and reach;
- stimulation of particular sectors such as transportation and energy that have largely negative environmental side effects;
- increased likelihood of economic crises;
- commodification of resources such as water and the decline of traditional local controls on resource use;
- spatial separation of action and impact from responsibility; and
- further ascendancy of the growth imperative.

As well, this analysis presents "a set of factors that suggests that globalization may help environmental quality":

- Global corporations can spread the most advanced environmental management technology and techniques.
- The strengthening of capacities in government to manage economic affairs can have spillover effects, strengthening environmental management.
- Globalization can lead to increased incomes, which in turn can lead to increased government spending on environmental and social programs and to increased public demand for environmental amenities.
- And increasing international trade in resources such as timber could lead to higher prices, more secure property rights, and larger investments in sustaining forest resources.

In summary, "While something can be said for each of these [latter four] forces, their effects are certainly farther down the road than most of the negative effects mentioned earlier. Nor, on balance do they seem as powerful."

Source: Speth 2003

and their implications for ecosystem services and human well-being (Box 2).

Growing economic integration is widely agreed to be a key component of the overall globalization picture. Central features of *economic globalization* include the increasing volume of cross-border transactions in goods and in international capital flows (Figure 1 and Figure 2). Both the volume and the variety of these economic interactions have experienced significant growth over the last two decades.

Economic globalization has had powerful effects on the environment and human well-being, in terms of the scale, patterns, locations, and technologies of production. Both luxury and basic foodstuffs are transported vast distances across the globe. Raw materials such as timber are extracted from forests in one country, processed and manufactured in another, and the final product sold to a consumer in a third country. In many developing countries—especially in Asia—increasing trade and inflows of foreign investment have stimulated economic growth by providing employment for local people, contributing

### Box 2: Definitions of globalization

- "...the intensification of worldwide social relations which link distant localities in such a way that local happenings are shaped by events occurring many miles away and vice versa." (Giddens 1990)

- "Shrinking space, shrinking time and disappearing borders are linking people's lives more deeply, more intensely, more immediately than ever before." (UNDP 1999)

- "...a historical process, the result of human innovation and technological progress. It refers to the increasing integration of economies around the world, particularly through trade and financial flows. The term sometimes also refers to the movement of people (labor) and knowledge (technology) across international borders. There are also broader cultural, political and environmental dimensions of globalization that are not covered here." (IMF 2002)

- "Globalization is commonly understood to describe the increasing flow of goods, services, capital, technology, information, ideas and labour at the global level, driven by liberalization policies and technological change" (Annan 2002).

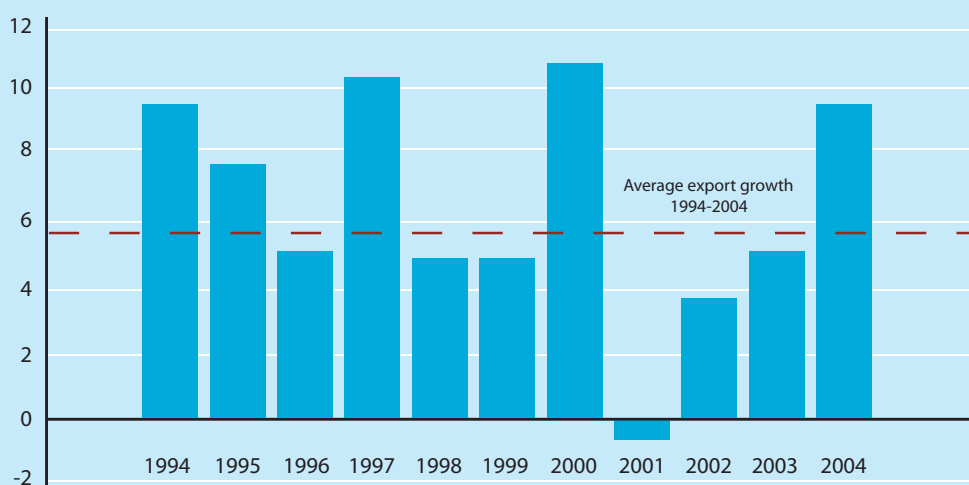
to infrastructure development, increasing incomes, and removing hundreds of millions of people from absolute poverty. Yet in many cases, these gains have led to difficult trade-offs in terms of pollution or increased environmental degradation.

Closely linked with economic globalization is *technological globalization*, which encompasses the

technologies used for extraction and production of mineral and agricultural materials, manufacturing, transport, telecommunications, and other services—as well as the increasingly rapid development and diffusion of these technologies. These technologies can benefit or damage the environment, in some cases reducing environmental risk and damage by promoting clean

Figure 1: Growth in the volume of world merchandise trade, 1994-2004

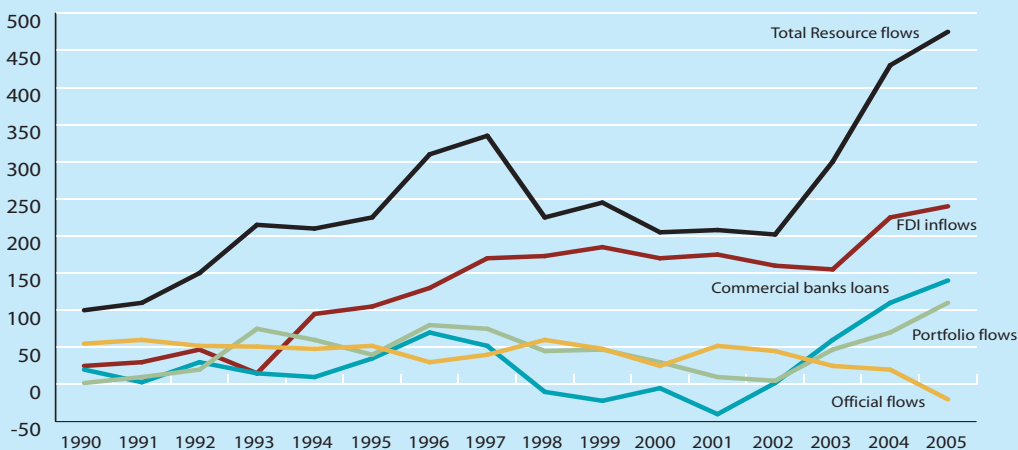
(Annual percentage change)



Source: WTO 2005

Figure 2: Total net financial resource flows, 1990-2005

(Billions of dollars)



Source: UNCTAD 2006



Bangkok pedestrian eyes the cultural offerings of the west.  
Source: J. Royan / Still Pictures

energy or efficient production processes while in other cases increasing risk and damage by facilitating diffusion of threats and overexploitation of resources.

Growing international transport for trade and travel, for instance, has made it possible for invasive species to survive and spread to places that were previously out of range, a trend that has become a major source of ecosystem decline worldwide (see Africa section). Ballast water in ships can transport around the world species such as the zebra mussel and the Chinese mitten crab that wreak havoc in lakes and seas (WRI 2006). And growing air travel has provided opportunities for pests to reach new populations. For example, the brown tree snake—a stowaway on flights from New Guinea—wiped out 9 of 11 native bird species in Guam in the late 20th century, severely damaging biodiversity on that island.

Similar forces are also increasingly at work in the spread of human diseases. The spread of SARS, in March 2003, has been linked to air travel. Other diseases that might spread in a similar way include dangerous influenzas with incubation periods that allow travellers to carry the illness aboard a plane to a new destination before falling ill (CDC 2005, New Scientist 2005).

Rapid advances in communications technologies are one of globalization's most powerful driving forces. These technologies offer substantial environmental benefits,

such as reducing the need for physical travel while providing access to an expanding knowledge base.

The number of people with access to that knowledge base is growing. By the end of 2005, global documented Internet usage reached more than one billion people (InterNetStats 2006). Increasing Internet and email use provides widespread availability of useful information for governments and many others to make evidence-based decisions about the environment and to facilitate sustainable resource management. Affordable, reliable, and ubiquitous mobile phone networks are now linking millions of new users—including large numbers of poor people and those in very isolated locations—into systems through which they can gain vital information to benefit their health and wealth (Figure 3).

The rapid growth of information and communications technologies has also brought its own environmental risks and challenges. The growing problem of electronic waste is a case in point. An estimated 50 million metric tons of e-waste replete with toxic materials are generated annually as consumers replace used electronics such as computers and mobile phones with the latest models (Environmental News Service 2006).

A key challenge related to the globalization of communications and knowledge is the need to respect local, traditional, and indigenous cultures and to promote diversity. Many indigenous cultures emphasize the symbiotic relationship between nature and humans—but they are increasingly challenged by

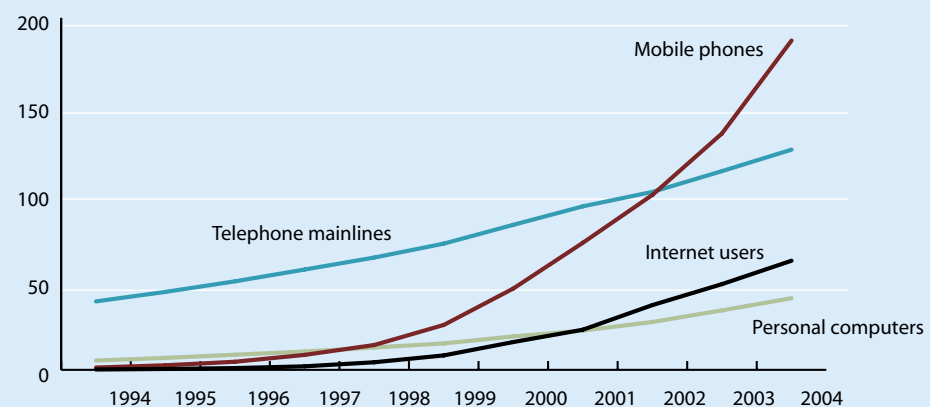


Electronic waste is becoming a serious environmental issue in both developed and developing countries.  
Source: H. Schmidbauer / Still Pictures

the spread of dominant or homogenized cultures which often do not highly value such relationships.

Economic globalization and technological globalization have been accompanied by, and have contributed to, some measure of *political globalization*. Since its establishment in 1945, the United Nations (UN) system has been evolving in response to changing global realities. Through the work of a myriad of agreements, arrangements, treaties, and institutions including UN agencies, political globalization has responded to and in turn facilitated the globalization of economics, technology, and governance.

Figure 3: Information and communications users in low and middle income economies (per 1 000 people)



Source: World Development Indicators 2006, The World Bank

Recent decades have seen the development of increasingly specific and legally binding rules on economic policy-making. Notable examples include the many rules and provisions enforced by the World Trade Organization, as well as the economic policy reforms that are often required by the IMF and the World Bank as part of structural adjustment and other policy-based lending programmes. Regional economic treaties and institutions include the European Union, the North American Free Trade Agreement, and the Central American Free Trade Agreement. Many of these have significant implications for the ability of individual governments to address environmental and social challenges related to economic policies.

In many quarters, governance is no longer viewed as the domain of governments alone. Civil society and the private sector are becoming increasingly engaged in international diplomacy and policy issues. The number of international non-governmental organizations (NGOs) grew rapidly over the last century, climbing from 176 in 1909 to nearly 30 000 in 2004 (Union of International Associations 2006) (Figure 4). Prominent among them are groups devoted to human rights, peace, women's rights, environmental issues, and development. The number and scale of transnational corporations has also climbed rapidly in recent decades, rising to an estimated 77 000 today, accounting for over US\$20 trillion in annual sales (UNCTAD 2006).

In the environmental sphere, political globalization has led to numerous environmental treaties over the last several decades. These cover shared environmental resources and concerns including trade in endangered species, the spread of hazardous chemicals, the steady loss of the Earth's biological diversity, the proliferation of air pollutants, management of oceans and fisheries, and the threat of climate change (see Indicators section).

### LINKING GLOBALIZATION, ECOSYSTEM SERVICES, AND HUMAN WELL-BEING

The perspective of ecosystem services offers fresh insights into the links among globalization, the environment, and human well-being, as well as the challenges arising from these linkages. A better understanding of these links and challenges can strengthen the design and implementation of responses to maximize the benefits of globalization, while minimizing the negative effects.

The Earth's ecosystems provide humans with essential services, ranging from water purification and waste treatment to the provision of food, fibre, and genetic resources. The Millennium Ecosystem Assessment (MA) is currently the most comprehensive knowledge base on the links between ecosystem services and human well-being. The MA identified four main classes of ecosystem services—provisioning, regulating, supporting, and cultural



These minefields in Nicaragua have rendered this land unusable  
Source: Jorgen Schytte / Still Pictures

services—and clearly showed how these are linked to various aspects of human well-being (Figure 5). The MA emphasizes that human well-being involves far more than just material wealth and should be considered as a multi-dimensional concept encompassing health, security, social relations, and the extent to which individuals have the ability and the opportunity to achieve their aspirations.

The MA found that 15 of the 24 major ecosystem services examined in the assessment are being degraded or used unsustainably. The degradation of these services often causes significant harm to human well-being. For instance, environmental degradation affects human health through the spread of vector-borne diseases and the incidence of respiratory illnesses. Human security is threatened by conflicts over natural resources (see Africa section), while conflicts themselves can lead to environmental degradation and the loss of other ecosystem services (see West Asia section). Importantly, the costs of such degradation are often borne disproportionately by the poor and they represent a barrier to the achievement of the Millennium Development Goals.

The links among globalization, ecosystem services, and human well-being are complex. The forces of

Figure 4: Trends in number of active international organizations: 1900-2004



Source: Union of International Associations

Figure 5: Linkages between ecosystem services and human well-being



The strength of the linkages and the potential for mediation vary in different ecosystems and regions. In addition to the influence of ecosystem services on human well-being depicted here, other environmental (as well as economic, social, technological, and cultural) factors influence the balances. And ecosystems are in turn affected by changes in human well-being.

Source: MA 2005



Shared between Bangladesh and India, the Sundarbans region of the Ganges delta contains the largest mangrove ecosystem in the world. Source: SHEHZAD NOORANI / Still Pictures

globalization can affect ecosystem services in both beneficial and harmful ways and they can affect different ecosystem services in different ways. It is inadequate to view the environment simply as a natural resource base influenced by globalization through economic growth and material prosperity alone (see Latin America and the Caribbean section).

Globalization trends have increased the provision of some ecosystem services that benefit human well-being, such as crops and livestock. At the same time they have led to declines in other critical ecosystem services including water supply, natural hazard protection, genetic resources, and the biodiversity that underpins all ecosystems. These trade-offs among different ecosystem services affect human well-being—

often as gains for some groups of people and losses for others.

These complexities are evident in the case of mangrove ecosystems, which are increasingly threatened by conversion to aquaculture. The increase in aquaculture production from converted mangrove lands has been at the expense of other ecological services provided by intact mangrove ecosystems such as water filtration, soil retention, flood prevention, and sheltering of juvenile fish. In many cases, the trade-offs among these services are not fully assessed when decisions on mangrove conversion are made (Box 3).

Terrestrial ecosystems are also feeling the impact of globalization's reach. Transformation of terrestrial

ecosystems, mostly to croplands, accounts for a significant proportion of ecosystem change since 1950. Only landscapes that are inaccessible or relatively unsuited to agriculture have remained comparatively intact (MA 2005a). This global trend in conversion of land for cultivation continues—with a focus now on tropical agriculture.

Large-scale, industrial production of beef, soybeans, cotton, and biofuels is expanding into the tropical latitudes of Latin America and could soon reach tropical Africa. A similar expansion of oil palm cultivation is occurring in Southeast Asia (Figure 6). Together with the spread of agricultural biotechnology, these trends represent what may be the most important agricultural transition since the

### Box 3: Aquaculture, mangroves, and ecosystem services

Around 35 per cent of the world's mangrove area has been lost, according to the MA estimate based on data from countries which account for half the global area of mangroves. One reason for the loss has been the rapid growth of the shrimp sector driven by global demand. Many governments in tropical and sub-tropical regions have provided incentives for small and big businesses to move into shrimp farming, notably in India, Sri Lanka, Thailand, and Vietnam—but also in some countries in Latin America and Africa. This combination of a growing global market and government incentives has led to a massive conversion of mangrove lands to shrimp aquaculture.

These changes have mixed effects on human well-being, given the gains and losses in different ecosystem services. In the case of Thailand, the total economic value of an intact mangrove ecosystem offering a suite of ecosystem services has been estimated to be US\$1 000 per hectare, compared to only around US\$200 per hectare when completely converted to shrimp farming.

Importantly, the distribution of these gains and losses, and the corresponding impacts of human well-being, has been uneven. The well-being of some social groups has improved, particularly those who have benefited through increases in material wealth from aquaculture, such as owners of large farms. Small farms have also benefited, but many of them only in the short run. Once problems emerge due to disease from polluted water—a byproduct of the shrimp farms—many small farmers face financial ruin.

These private economic gains have to be measured against the losses of the ecosystem services provided by intact mangroves. Mangroves provide many provisioning services, including serving as important sources of construction materials and biomass fuels. Mangrove ecosystems host a variety of medicinal plants which are used by local communities and provide nurseries for many fish and shrimp species, including many commercially important fisheries.

Mangroves also provide critical regulatory ecosystem services in terms of shoreline protection. Recent studies of the 2004 tsunami indicate that in Sri Lanka areas with healthy and intact mangrove ecosystems suffered less damage than areas with degraded or destroyed mangrove ecosystems. In these ways, the security and livelihoods of local coastal communities dependent on the services from intact mangroves has been reduced, representing a loss of human well-being.

However, the negative trends observed to date do not need to continue. Numerous studies show that with proper land and water management, including buffer zones of intact mangroves, aquaculture can be sustainable and mangrove ecosystems can continue to deliver other valuable provisioning, regulating, and supporting services.

Sources: MA 2005, Sathirathai and Barbier 2001, Duraiappah 2003, Ellison 2000, UNEP 2006, Hiraishi and Harada 2003

### Figure 6: Conversion of forested areas into palm oil plantations in Papua, Indonesia

Indonesia is the second largest producer of palm oil in the world, after Malaysia. The drive to meet the demand for palm oil is resulting in conversion of forested areas into palm oil plantations. These satellite images reveal how a combination of transmigration, logging interests, and palm oil plantation development have transformed an area that was previously tropical lowland rain and forest. The 1990 image shows the first signs of development in this region, with the jagged access road network forming the only break in the forest cover. The 2002 image clearly shows a checkered pattern of plantations in the primary development area, and the extension of the road network to the north, south, and southwest.



Source: USGS

Green Revolution (Nepstad 2006) (Box 4). The main driver of these changes is the growing global demand for agricultural products such as soy for ration-fed livestock and palm oil for both edible and inedible products in China and other emerging economies. The rising price of fossil fuels coupled with growing concerns about climate change are pushing demand for sugar cane, corn, soy, palm oil, and other crops that can be used to make biofuels (Nepstad 2006) (see Latin America and the Caribbean section).

While increasing production from these ecosystem provisioning services continues to improve the well-being of involved groups, this 'tropical agricultural revolution' carries with it important new threats to ecosystems in the tropics. Trade-offs include the loss of biodiversity, carbon sequestration, water regulation, and soil protection from the clearing of tropical landscapes, as well as health impacts such as from the smoke haze from slash and burn forest clearing which envelops much of Southeast Asia periodically (Nepstad 2006).

The global dimensions of the tropical agricultural revolution are perhaps even greater than for mangroves, given the scale of the ecosystem conversion taking place and the global ramifications of the increases in agricultural production with corresponding reductions in other ecosystem services. Again, the trade-offs among these various services and the distribution of consequences for

human well-being among different groups of people are often not fully considered in the decisions being made. However, the management of affected ecosystems can be improved—and in some cases those improvements are already being made.

### MANAGING GLOBALIZATION TO PROTECT ECOSYSTEM SERVICES AND HUMAN WELL-BEING

The mismatch between ecological imperatives and prevailing economic practice must be reconciled if the world is to enjoy the benefits of globalization, while avoiding a further unravelling of critical ecosystem services in the decades ahead. Fortunately, diverse actors are already responding to globalization's challenges for ecosystem health and human well-being in innovative ways and in multiple realms.



In Brazil crops are grown to produce biofuels for use in vehicles.

Source: Joerg Boethling / Still Pictures

#### Box 4: Managing the 'tropical agricultural revolution'

The tropical agricultural revolution brings with it new opportunities for sustainable ecosystem management and poverty reduction. The rising environmental and social standards sought by many importers and consumers of agricultural commodities can offer a strategy for reducing the negative ecological and social impacts of this transition.

Motivated by corporate risk aversion, consumer demand, and other factors, the higher standards for environmental and social performance that are emerging within the commodity marketplace are felt by producers even in the agricultural hinterlands of the Amazon rainforest through a variety of channels. When the International Finance Corporation extended a US\$30 million loan to one of the world's largest soy producers, the Brazilian Grupo André Maggi, it came with conditions attached. The five hundred Amazon and Cerrado soy producers who received pre-harvest financing through the loan to Maggi were required to demonstrate their compliance with environmental and social legislation and their steps towards the implementation of responsible agricultural practices.

In response to such requirements, the Round Table on Responsible Soy culminated its initial stakeholder consultations with the creation of an institution that will develop international social and environmental standards for the responsible production of soybeans. This initiative already enjoys commitments from major buyers of soy who will buy only from 'responsible' soy producers once the certification system is in place. These buyers include the European Union's animal ration industries, purchasers of 40 million metric tons of soy each year (three quarters of the Brazilian harvest). Similar pressures are being felt in the global palm oil industry, particularly in Southeast Asia, with the Round Table on Sustainable Palm Oil now growing in prominence.

There are some important obstacles to transforming these global pressures for improved environmental and social performance of food commodity producers into large-scale improvements in the protection of ecosystem services, the observance of sound labour practices, and the provision of social benefits through the tropical agriculture revolution. Since compliance with legislation is one of the cornerstones of responsible production systems, the costs of socio-environmental certification can become prohibitively high to aspiring producers. For example, when Brazil increased the mandatory forest reserves from 50 per cent to 80 per cent of private properties in the Amazon in 1998, it may have raised the environmental bar too high for current market realities. For many producers, compliance with this legislation was not economically viable in the absence of sharp increases in the prices of their products.

Despite these obstacles, the elements of a strategy are emerging for defending services provided by natural ecosystems and promoting greater social benefits within the new agro-industrial landscapes of the tropics. It is possible to imagine a future in which diverse agricultural regions are competing among themselves to produce soy, palm oil, beef, sugar cane, and other products with the highest environmental and social standards.

Source: Nepstad 2006

#### Developing markets for ecosystem services

Creative economic instruments can help manage ecosystem services threatened by globalization forces. Creating markets for ecosystem services is increasingly recognized as one such tool. These instruments can generate financial resources, channel funds to environmentally sound technologies, create incentives for investment, and increase the involvement of the private business sector in environmental management.

Some eminent economists argue that the carbon sequestration value alone of tropical forests may be worth tens if not hundreds of billions of dollars a year (FSC 2006). Currently the countries and communities whose forests provide this service are left uncompensated for the pollution they remove and the economically damaging climate change they avert.

Payments could take various forms, depending on whether they are part of a publicly funded programme, the result of a self-organized private deal, a trade under a regulatory cap, or part of an eco-labelling or carbon offset programme. The scale of implementation of payments schemes varies according to the services under consideration. Transactions in water-related services such as sediment control are found at local and regional levels while carbon sequestration mitigation arrangements, such as those to be channelled through the Kyoto Protocol's Clean Development Mechanism, apply at the global level.

For example, in Costa Rica, hydro-electric companies pay communities upstream not to cut down trees. It makes economic sense because deforestation destabilizes the soil and can trigger the siltation of

dams. There may be opportunities to extend current payments for ecosystem service systems to manage other natural resources in a more sustainable manner.

One example of an effort to ensure payment for ecosystem services involves the Panama Canal, through which 278.8 million metric tons of internationally traded goods moved between the Atlantic and Pacific Oceans in 2005 (Panama Canal Authority 2006). The canal uses water from upland reservoirs to buoy ships up and over the isthmus cordillera. The dams that create the reservoirs also serve as power generators for the region. Over the last few decades deforestation around the high reservoirs has led to a number of problems for the Panama Canal system—especially a shortage of water in some seasons.

Environmentalists, scientists, and concerned governments agree that the watersheds should be reforested but funding is a problem. A creative solution to reforesting the slopes surrounding the Canal's reservoirs comes from a forestry reinsurance company. To pay for the reforestation the reinsurance company proposed a financial market for shippers that depend on the canal. In this scheme, insurance and reinsurance partners underwrite a 25-year bond to pay for the reforestation and ask their clients to buy the bond in exchange for reduced premiums. Firms that insure against the huge losses they would suffer if the canal

were closed are paying for reforestation through the 25-year forest bonds and compensate on their books with lower insurance premiums (UNEP 2005).

In the light of the deteriorating trend in ecosystems highlighted by the MA, efforts to create markets for ecosystem services will take on a greater role in the future in providing incentives for conservation and sustainable use of ecosystem services. This is largely a welcome development, but it is important to note that traditionally markets are not designed to address issues of poverty and inequality. Therefore, when designing markets for ecosystem services, equity issues must be specifically examined and addressed.

### Promoting environmentally sound technology

Many countries are seeking another opportunity offered by globalization: that of becoming leaders in the global marketplace for cutting-edge green technologies (see Nanotechnology section). China, for example, has become the world's largest manufacturer of energy-efficient compact fluorescent light bulbs, in part through joint ventures with lighting firms based in Hong Kong, Japan, and the Netherlands (French 2006). Solar energy has also become a growth industry in China, so successful that the seventh richest man in the country is a manufacturer of silicon photovoltaic solar cells (Friedman 2006). And India has become a major manufacturer of advanced wind turbines for use both domestically and in overseas markets (Bradsher 2006).

Many people in countries with unreliable or unavailable power grids are installing small-scale independent energy sources to meet their needs. Renewable energy technologies have evolved, costs have come down, and small-scale solutions—such as solar photovoltaics, solar hot water, and biogas digesters—have been successfully commercialized in some parts of the world. But broad uptake of these technologies is still modest. The International Energy Agency (IEA) has projected that by 2030—in the absence of vigorous new policies—1.6 billion people will still be without access to electricity and 2.6 billion will continue to cook and heat with traditional and polluting forms of biomass supply (IEA 2002). To address the energy access challenge, more needs to be done to incorporate renewable technologies into the energy mix, including the introduction of new financing instruments (Box 5).

### Box 5: Financing renewable energy technologies

If renewable energy technologies are to be widely adopted even in poorer countries, bold new approaches will be needed to overcome financial constraints and policy inertias. One way of facilitating adoption of new technologies is for lending institutions to offer loans for small-scale investments in the technologies.

To advance the use of renewable energy sources, credit support programmes are being piloted which help local banks build their first clean energy loan portfolios in countries where the growth of such schemes has been constrained. In addition to scaling up use of renewable energy technologies at local and national levels, these projects aim to build experience and transfer best practice across countries and regions, as well as to influence national policy-makers.

In 2003 a partnership was established, including two of India's largest banking groups, to provide consumer financing for solar home systems at preferential interest rates. The programme provides these banks with an interest rate subsidy, marketing support, and a vendor qualification process. In three years the programme has financed 17 310 solar home systems which together supply energy to over 100 000 people. In 2003 the solar home sector was largely a cash-only business but in 2006 over half of sales were financed through the original partners and other banks that have now entered the market. A similar loan programme is underway in Tunisia for solar water heaters.

An interesting lesson from these programmes is that there can be an effective feedback loop from the actions of the banking community to policy makers. When banks begin to scale up lending to the renewable energy sector it sends a positive signal to policy makers that the technology is mature and ready to play a significant role in the country's energy mix. This contradicts the conventional wisdom that investment only engages once the right policies are in place. Instead, financing and policy development can evolve in parallel, with each institution influencing the decisions and actions of the other.

Source: UNEP 2003



A container ship moves through the Miraflores locks of the Panama Canal which are supplied with fresh water from upland reservoirs to float the ships.

Source: Rainer Heubeck / Still Pictures



Women in India walk past power generation installation driven by winds from the Bay of Bengal.

Source: Joerg Boethling / Still Pictures

### Utilizing information, communications, and monitoring technologies

Information and communications technologies are a key component of globalization, offering substantial opportunities to promote environmental quality and human well-being through capacity building and electronic networking.

Civil society organizations have learned to use the new tools of the information age to organize themselves into effective cross-border alliances. The Climate Action Network, for instance, has been a tenacious player in the international climate negotiations for more than a decade (CAN 2006). The Third World Network has helped developing-country NGOs to gain a voice in international deliberations in diverse arenas, from the annual World Economic Forum held at Davos, Switzerland to the United Nations and the WTO (TWN 2006).

Information and communications technologies also have the potential to save countless lives as they become increasingly used to disseminate disaster alerts and early warnings. Similarly, new environmental monitoring technologies and processes offer promising pathways

to a better understanding of the environment and wiser management of the Earth's resources. Remote sensing satellites now provide a continuous stream of data. They are capable of rapid and effective detection of environmental hazards such as transboundary air pollutants, wildfires, deforestation, changes in water levels, and the extent of natural and anthropogenic disasters. Satellite tracking systems can also be used as part of enforcement to help reduce illegal logging, for example.

Within the last decade new observing systems have emerged that integrate data collected in the field with satellite-based observations for modeling and analysis of components of the Earth system. These include the observing systems dedicated to climate, ocean, terrestrial, and atmospheric phenomena. More recently, in February 2005, the Group on Earth Observations was established with the purpose of building a coordinated, comprehensive, and sustained Global Earth Observation System of Systems by the year 2015. With rapid advances in data collection, analysis, visualization, and dissemination techniques, it is now relatively

inexpensive to deliver useful environmental information on a regular basis to a global audience.



A family in Pakistan uses a solar/windup radio to stay informed after the 8 October 2005 earthquake.

Source: Mark Edwards / Still Pictures

One example is Brazil's National Institute for Space Research (INPE), which has been applying satellite technology to observe and monitor the state of the Amazon forests for many years. As the technology continues to advance, scientists and decision makers can more accurately and quickly assess the deforestation rate in the Amazon. Building on the results of a research partnership with the University of Maryland-College Park and South Dakota State University, INPE has developed a new monitoring application for detection of deforestation in the Amazon known as the Real Time Deforestation Monitoring System, based on data from NASA's Moderate Resolution Imaging Spectroradiometer (MODIS) (Figure 6).

Although these new initiatives are promising on many levels, some hurdles remain before they can be used to maximum effect. Key challenges include technological capability gaps between developed and developing countries; issues related to ownership, intellectual property rights, and

acceptance of the new technologies; and questions about incorporation of traditional knowledge, sustainability of observing systems and networks, and equity of access to them.

### Strengthening environmental governance

Globalization in its many guises poses enormous challenges to governance structures at the local, national, and global levels. Key issues include:

- market failures such as externalities (benefits or costs to third parties that are not included in the market price of goods or services);
- policy shortcomings such as perverse incentives (subsidies, tax structures, and grants that have the side-effect of encouraging environmentally damaging activities); and
- institutional failures such as weak property rights (applying to commons like traditional pastures, the open seas, and the atmosphere).



Students in Sumatra map out community borders using a global positioning system.

Source: Mark Edwards / Still Pictures

**Figure 6: Use of satellites to monitor Amazonian deforestation**

One example of the benefits delivered by globalized observation and communications technology is the use of satellite data to monitor environmental change. Here, detection of deforestation in northeastern Mato Grosso, Brazil, is shown in yellow for 2002, blue for 2003, and red for 2004. Remaining forest cover in 2004 is shown in green. Background values for non-forested regions are Normalized Difference Vegetation Index (NDVI) values from the MODIS 16-day composite from 8-23 May 2004. Data from NASA's Moderate Resolution Imaging spectroradiometer (MODIS) aboard the Terra and Aqua satellites and high resolution Landsat satellite.



Source: Doug Morton, University of Maryland-College Park

Recognition is growing among many people and governments that an overarching cause of these threats is the lack of integration and coherence between different policy frameworks reflecting diverse societal objectives.

National governments by themselves are ill-suited for managing environmental problems that transcend borders, whether by air and water currents or through global commerce. Yet effective international environmental governance is still in its infancy. The treaties and institutions that governments turn to for global management are often too weak to respond adequately to the problems (Speth 2003). Nonetheless, recent decades have seen a steady expansion in the number of countries that are party to Multilateral Environmental Agreements (MEAs) (see Indicators section). And, despite their shortcomings, the MEAs and their progressive adaptations collectively form one of the best opportunities available today for managing some of the world's most widely recognized but poorly addressed global and trans-boundary environmental issues.

The 1987 Montreal Protocol on Substances that Deplete the Ozone Layer is often cited as one of the most effective of the MEAs. The story of its implementation provides pointers to several criteria which have contributed to its success—many of them closely linked with globalization (Box 6).

In addition to the MEAs, several international institutions are key actors in the current system of global environmental governance, including the United Nations Environment Programme (UNEP), the United Nations Development Programme, the Global Environment Facility, and the World Bank. There has been a lively debate in recent years about how to make international environmental governance work as effectively as possible. Current attention is particularly focused on the important recommendations contained in *Delivering as One*, the report of the Secretary-General's High-level Panel on UN System-wide Coherence in the Areas of Development, Humanitarian Assistance, and the Environment. The Panel's report, issued in November 2006, recommended that the system of international environmental governance should be strengthened and made more coherent; the UN Environment Programme should be upgraded with real authority as the UN's 'environment policy pillar', multilateral environmental agreements should continue to pursue efficiencies and coordination among themselves, and there should be an independent assessment of international environmental governance within the UN system (UN 2006).

In recent years, nations have granted significant and growing powers to global economic institutions such as the World Trade Organization (WTO), the World Bank, and the International Monetary Fund (IMF). The World Bank and the IMF in particular were strongly

identified with the so-called 'Washington Consensus' of the 1980s and early 1990s, which held that economic policies such as trade and capital market liberalization were the best path to economic and social development (Gray 1988). Joseph Stiglitz, a former World Bank Chief Economist, voiced the widespread opinion that these policies concentrated "too much on just an increase in GDP, not on other things that affect living standards." Stiglitz also argued that international financial policies "focused too little on sustainability—on whether growth could be sustained economically, socially, politically, or environmentally" (Stiglitz 2006).

Steps have been taken at each of these organizations in recent years to incorporate environmental issues and sustainable development concerns into their activities. The World Bank, for instance, adopted a new Environment Strategy in 2001 that has the goal of integrating sound principles of environmental sustainability in all investment policies, projects, and programmes (World Bank 2001). With the objective of minimizing clashes between trade and environmental rules and to promote synergies between them, in November 2001 governments agreed in Doha, Qatar, to hold talks on selected environmental issues as part of the Doha Round of world trade talks. Among the issues on the table are:

- the trade implications of environmental labelling requirements;

- the relationship between WTO rules and trade measures contained in multilateral environmental agreements;
- the effect of environmental measures on market access;
- efforts to reduce fishing subsidies; and
- tariff and non-tariff barriers to trade in environmental goods and services.

To date there has been little substantive progress on any of these issues, except fisheries subsidies (**Box 7**).

### **Involving civil society and the private sector**

Recent years have seen growing recognition of the importance of involving relevant stakeholders in international policymaking and governance. The right of various major groups of non-governmental and other organizations, including indigenous peoples, the private sector, trade unions, and women's groups to participate in international policymaking was formally recognized at the 1992 Rio Earth Summit and has since been institutionalized at the UN Commission on Sustainable Development, at UNEP, and in many other environmental policy arenas (UN 2002). Efforts are underway at the World Bank, the IMF, and the WTO to promote greater engagement with civil society and other actors.

International institutions are also increasingly taking steps to involve the private sector in their work.

### **Box 6: Protecting the ozone layer**

The stratospheric ozone layer protects ecosystems and all life on earth from the damaging effects of solar ultraviolet radiation. When scientific evidence showed that certain man-made chemicals were depleting this layer the global community responded rapidly by adopting the Montreal Protocol on Substances that Deplete the Ozone Layer in 1987. The Montreal Protocol provides cradle-to-grave management of these ozone depleting chemicals by requiring Parties to phase out their production and consumption according to agreed timetables. Providing countries fully meet their Montreal Protocol obligations, the ozone layer is expected to repair itself through natural processes and return to its pre-Montreal Protocol level by 2049 over mid-latitudes and around 2065 over the Antarctic (see Polar section).

Ozone-depleting substances (ODS) are ubiquitous, having long been manufactured, used, and traded as part of the global economy. Chlorofluorocarbons, halons, carbon tetrachloride, and methyl bromide have been used in applications as diverse as refrigeration, foam blowing, industrial cleaning, fire extinguishing, soil fumigation, and cosmetic and pharmaceutical products. To phase them out, the Protocol is driving a global shift in consumption and production habits to more ozone-neutral equipment, chemicals, and practices through the support and active participation of multiple actors in industry, government, scientific bodies, and civil society.

Political support for the phase-out of ODS has been overwhelming. As of December 2006, the Montreal Protocol has been ratified by 191 countries and the European Community. Their collective effort has resulted in a total phase-out of nearly 95 per cent of all ODS by 2006 (see Indicators section).

The Protocol has accomplished this shift through various means. For example, the treaty controls ODS trade through mandatory national import/export licensing systems and bans or restrictions of ODS trade with non-Parties. In addition, the Protocol indirectly created a new international market for technologies that replace ODS, encompassing chemical products, equipment, and related services.

International support for developing countries has also proven to be critically important. Recognizing that countries have a common but differentiated responsibility to protect the global ozone commons, the Parties established the Multilateral Fund in 1991. This enables developing countries to comply with their obligations under the treaty by meeting agreed incremental costs. The assistance provided by the Fund, amounting to over US\$2 billion as of April 2006, has enabled 139 developing countries to undertake over 5 250 ozone protection projects and activities.

Source: UNEP 2006

## Box 7: Fisheries subsidies reform—an opportunity for the WTO

Seventy-five per cent of commercially exploited fish stocks worldwide are either depleted or threatened by over-fishing. Scientists predict that the world will run out of seafood by 2048, if marine fish stocks continue to decline at current rates. This would create serious threats to global food security, coastal water quality, and ecosystem stability, endangering the livelihoods of current and future generations (see Global overview section).

Nearly 40 per cent of fish and fish products enter world trade and over half of this amount originates from developing countries. Estimates suggest that around 30 million people derive their income directly from fishing activities, 95 per cent of them located in the developing world. Net revenues from fish exports earned by developing countries reached US\$18.3 billion in 2003—more than the combined developing country net total for other food commodities.

Despite the importance of conserving fish stocks, there are immediate economic incentives to catch as many fish as possible. Available estimates suggest that commercial fishing fleets' overcapacity is as high as 250 per cent. Government subsidies to preserve shipbuilding and fishing jobs have been blamed for generating this overcapacity and the resultant over-exploitation of fish stocks.

Total fisheries subsidies worldwide have been estimated at US\$20 billion per year, representing nearly 20 per cent of fishing industry revenue. This degree of support distorts patterns of production and international trade and artificially enhances the competitive advantage of subsidized fleets in regions of common fisheries resources. Non-subsidized fleets cannot compete against such odds. UNEP analysis has shown that under most real-world conditions—less than perfect management schemes and fully utilized fish stocks—subsidies have harmful and potentially irreversible environmental effects.

Developing countries have suffered disproportionately from the negative effects of subsidies, due to the sector's importance for income generation, employment, and food security. The damage is often compounded where local artisanal fisheries face competition with subsidized fleets from major and distant fishing powers.

At the 2002 World Summit for Social Development, heads of state placed international action on fisheries subsidies among the top eight priorities needed to achieve sustainable fishing and they singled out the WTO as the key forum for international action. Now there is broad agreement that reforming fisheries subsidy policies in the WTO provides a clear opportunity to deliver gains for the international trading regime while fostering sustainable development and protection of the environment.

The 2001 Doha Ministerial Conference first integrated fisheries subsidies into the negotiating mandate with instructions to 'clarify and improve' the WTO rules on fisheries subsidies. This mandate was solidified at the Hong Kong Ministerial Conference in December 2005. For the first time in the history of the WTO, the correlation between fisheries subsidies and problems of over-fishing and over-capacity was formally recognized—placing environmental concerns at the heart of trade negotiations. Ministers called for the prohibition of such subsidies. They also acknowledged that 'appropriate and effective special and differential treatment' should form an integral part of the negotiations, highlighting the sector's importance to poverty reduction, livelihoods, and food security concerns.

Substantial progress has been made since Hong Kong. Delegations have submitted a number of concrete proposals that clearly tackle the relationships among trade, environment, and development and suggest ways of prohibiting the most harmful subsidies.

However, considerable political and technical challenges still remain. First, negotiations must give more attention to the unique challenges faced by developing countries, including their over-exploited waters and their heavy dependence on income and employment in fisheries, as well as on international revenue from fisheries trade and fisheries access agreements. Second, governments must be required to disclose their fisheries subsidies, since the effectiveness of regulation depends on reliable enforcement, reporting, and transparency provisions. Finally, the actual rules must incorporate sustainability indicators such as the health of a fishery and the effectiveness of management systems. This will require drawing on available data and expertise outside the WTO and collaborating with bodies such as the FAO, Regional Fisheries Management Organizations, and UNEP.

Meeting these challenges will require WTO to go beyond its most familiar practices. In developing subsidies rules, the WTO will have to link with issues of sustainability without pushing its mandate beyond its limits. WTO fisheries negotiations offer a unique opportunity for the organization to realize the sustainable development objective contained in the WTO preamble. It is an opportunity to demonstrate that outcomes benefiting trade, environment, and development are not just rhetoric—they are realistic and attainable.

*Sources: Worm 2006, FAO 2004 and 2006, UNEP 2002, 2004 and 2005.*

For example, UN Secretary-General Kofi Annan unveiled the Global Compact in 2000, which calls on participating companies to "embrace, support, and enact" within their operations ten core values related to human rights, labour standards, environmental protection, and anti-corruption. Three principles guide participating businesses in regard to the environment—to take a precautionary approach to environmental challenges, to adopt initiatives to promote greater environmental responsibility, and to encourage the development and diffusion of environmentally sound

technologies. By mid-December 2006, 2 400 companies had signed on, along with 600 other labour, academic, and non-governmental organizations (United Nations Global Compact 2006).

In many cases, corporations are acting independently to factor sustainability into their operations. In recent years there has been rapid growth, especially in developed countries, in the reporting of large corporations' social, environmental, and corporate responsibility performance. Environmentally sound standards like the International Standards Organization's

ISO 14000 and new ones like the ISO 26000 on sustainability management are being adopted in growing numbers (ISO 2006) (see Indicators section).

Private financial institutions have taken important steps in recent years to integrate environmental considerations into their lending and investment. For example, in 2003, 17 leading banks from 12 countries adopted the Equator Principles, a set of voluntary guidelines for managing environmental and social risks in national and international lending operations. Participating Equator Banks agreed to require clients

## Box 8: Forest certification

Natural forest ecosystems are of primary importance to human well-being and planetary health. Forests provide raw material for fuel and shelter. Forest ecosystems also supply watershed services (water quality, quantity, and rate of supply), soil stabilization and runoff control, air quality, climate regulation, carbon sequestration, biological diversity, recreation, non-timber products, and aesthetic values.

All these benefits are under threat. Between 1960 and 1990, 20 per cent of the world's tropical rainforest was destroyed. There have been long-standing efforts to reverse these trends. During the 1992 Environment and Development Conference in Rio de Janeiro many stakeholders worked to establish an international convention to control and reduce the rampant deforestation documented by researchers. A convention was never agreed but alternative approaches to managing forests and forest products in a sustainable manner have emerged, including the International Tropical Timber Agreement and its new successor agreement, the Intergovernmental Forum on Forests, as well as Forest Law Enforcement and Governance initiatives.

One of the most intriguing management tools is forest certification. Discussions about the possibility of certification and accreditation of forest products began seriously in 1990 and in 1993 the Forest Stewardship Council was founded to establish a programme to certify particular timber commodities as products of sustainable forests and sustainable forest practices.

Forest certification is an international market-based tool and relies on 'ethical consumers' exercising a preference for products labelled as sustainably produced. Forests certified under the scheme have to comply with the FSC's Principles and Criteria to demonstrate responsible forest management. To address the circumstances of small forestry managers and owners, especially those in tropical and less developed countries, the FSC established specific procedures which reduce costs of certification and streamline procedures for Small and Low Intensity Managed Forests.

Another approach that reduces costs and streamlines procedures for smaller producers is group certification, combining a number of small forest areas under a single group manager who follows the certification process. This scheme also provides benefits to individual group members by allowing assessments based on samples, thus reducing auditing costs.

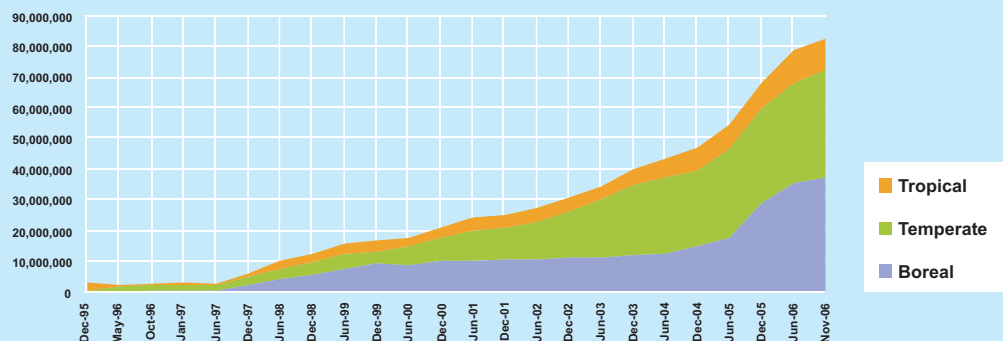
While the original driver for certification might have been uncontrolled deforestation in the tropics, its adoption has generally been most successful in the northern hemisphere in the temperate and boreal regions of the developed world. However, close to 13 per cent of total FSC certified forest area is now tropical forest, surpassing 10 million hectares in 2006.

In 2006, approximately 270 million hectares—7 per cent of the world's total forested area—are covered by certification schemes indicating that they are under a sustainable forest management regime. This is very significant growth since the Forest Stewardship Council issued that first certification in 1993. Today, FSC certification covers 28 per cent (approximately 75 million hectares) of the total area of certified sustainable forests. Over the last year alone, FSC certification has increased by one third, amounting to an additional 20 million hectares.

Forest certification is also practiced by the Canadian Standards Association, which covers 26 per cent of the total area of certified sustainable forests, and the Programme for Endorsement of Forest Certification covering 23 per cent.

Sources: UNECE and FAO 2006, FSC 2006

**Increase of FSC Endorsed Forest over Time  
(Dec '95 – Nov '06)**



The timber from this certified forest in Brazil is destined for the Faber Castell pencil production plant in Sao Carlos.

Source: Joerg Boethling / Still Pictures

borrowing money for large projects, such as dams and power plants, to adhere to the World Bank's environmental and social standards, which are rapidly developing into widely accepted international baselines for both public and private investments (French 2004). The number of signatories to the Equator Principles has since risen to 45 (Equator Principles 2006).

In a somewhat similar initiative aimed at private equity investors, UNEP helped broker the Principles for Responsible Investment (PRI), which were publicly launched in April 2006 by the UN Secretary-General at the New York Stock Exchange. As of December 2006, 54 institutional investors and 52 investment management companies, together controlling more than US\$5 trillion in assets for potential investment, have endorsed the PRI, which promote the integration

of environmental, social, and corporate governance considerations into their investment activities (UNEP 2006, PRI 2006).

Recognition is growing that innovative partnerships between diverse stakeholders—including businesses, labour unions, NGOs, and inter-governmental institutions—can help to bring about concrete results. This approach was endorsed at the 2002 World Summit on Sustainable Development, which generated more than 230 partnership agreements dedicated to achieving the sustainable development targets that were agreed in in Johannesburg (UN DSD 2003).

A related concept is the notion of 'global public policy networks'—joint initiatives involving NGOs,

businesses, national governments, and international institutions in which some or all of the parties come together to forge international guidelines or standards for specific activities in which they have relevant knowledge and a large stake in the outcome (Reinicke and Deng 2000) These transnational networks are by definition flexible and loose gatherings of experts rather than formally-negotiated intergovernmental treaties and institutions. Examples include the World Commission on Dams, the Millennium Ecosystem Assessment, and the REN 21 network formed in 2005 to promote the development of renewable energy worldwide (REN21 2006, Worldwatch Institute 2005).

Certification programmes are another important

form of multi-stakeholder initiative. These schemes harness consumer power through the use of market-based tools aimed at improving the management of ecosystems, while creating additional markets for environmentally sound goods and services. The pioneer was the Forest Stewardship Council (FSC), an independent body established in 1993 to set standards for sustainable forest production through a cooperative process (Box 8).

A Marine Stewardship Council (MSC) modelled on the FSC was created a few years later. So far, 19 fisheries have been certified for meeting the MSC's environmental standard of being well-managed

### Box 9: Sustainable tourism in Southern Africa

As well as the movement of goods and services, a significant aspect of globalization is increasing human movement across the globe in migration and tourism, with significant environmental impacts. New initiatives are emerging to harmonize tourism with sustainable development. Africa has become a prime destination for tourists from around the world. In 2004 tourism brought more than 33 million people to Africa who spent nearly US\$19 billion (UNWTO 2005). Sustainable tourism—a type of tourism that strives to preserve the landscapes, biodiversity, and cultures that draw the tourists in the first place—is on the economic agenda of most countries on the continent.

After a multinational signing in December, the establishment of the Kavango-Zambezi Transfrontier Conservation Area (KAZA TFCA) will allow a number of initiatives to progress, linking protected areas within the region and increasing tourism potential and related development (see Africa section). The initiative will support micro, small, and medium enterprises to increase local benefits from conservation. The Kavango-Zambezi TFCA is one of seven current TFCAs linking nine Southern African countries in an effort to maximize tourism opportunities.

This new effort provides a keystone for the Southern African Development Community (SADC) effort to preserve transfrontier conservation areas.

SADC's 1999 Protocol on Wildlife Conservation and Law Enforcement describes a TCFAs as "the area or component of a large ecological region that straddles the boundaries of two or more countries, encompassing one or more protected areas as well as multiple resource use areas."

The Peace Parks Foundation and the government of South Africa are promoting 'The TFCA Route'—a trail linking the Atlantic and Indian Oceans that traverses the conservation areas. The initiative plans to prepare a development corridor for visitors attending the 2010 Football World Cup in South Africa, creating jobs and building capacities within adjacent communities while upgrading accommodation and other services. Southern Africa anticipates facilitation of travel routes between countries through use of a single SADC regional visa by 2008.

Certification of sustainable tourism or ecotourism services is not a unified or centralized process in 2006, although discussions are underway to establish standards and benchmarks for a global system. National Geographic's Center for Sustainable Destinations provides documentation on various initiatives, reports, and services.

Sources: UNWTO 2005, Suich and others 2005, Peace Parks Foundation 2006, National Geographic 2006



Transfrontier Conservation Areas of Southern Africa could form nodes for planned tourist corridors.

Source: Peace Parks Foundation 2006

and sustainable, including the Alaska salmon fishery, the New Zealand hoki fishery, the Western Australian rock lobster fishery, and the South African Hake fishery (MSC 2006). Hundreds of seafood companies working with fish from these sources have achieved Chain of Custody certification that guarantees traceability of MSC-labelled seafood, ensuring that it has been separated from non-certified product at every stage from boat to table. In the last ten years, programmes that certify the sustainability of practices and products have extended from goods to services, including a certification programme for eco-tourism sites (see LAC regional report) (Box 9).

A priority for the future is to broaden such schemes to cover other natural resources that are traded internationally, such as minerals and biofuels, and to do so in a way that ensures developing country producers have equal opportunities to secure this type of certification and the additional market shares or price premiums that may result from them.

## CONCLUSION

Globalization is unfolding alongside growing evidence of serious degradation of the world's ecosystems. It is becoming increasingly urgent for policy-makers, leaders in business, and civil society—and all other decision-makers whose deliberations affect the management of ecosystems—to consider the implications of these converging trends. Yet, the evolving rules and practices of the global economy do not as yet pay sufficient regard to reversing trends which are negatively affecting the global environment.

The many promising examples and initiatives discussed above show that there are numerous ways to influence the forces of globalization to **protect valuable ecosystem services** and **enhance the well-being** of all who depend upon them. In many cases, there will be **trade-offs**—gains in some ecosystem services or for some groups of people, offset by losses in other services or for other groups. Innovative solutions can create **mutual benefits** where there are gains to be had all round. But often, **hard decisions** will have to be made with regard to choosing a particular set of benefits along with the costs that they entail. The key is to understand that there are **real choices** to be made, and to be fully cognizant of the **consequences and ramifications** of each decision.

Given the powerful forces of economic globalization,

instruments such as **markets for ecosystem services** can be designed and implemented to achieve economically efficient outcomes for managing ecosystems. Such instruments will need to take into account the limitations of markets, as well as the equity and distributional aspects of market outcomes.

Technological globalization also offers many opportunities for introducing and promoting **environmentally sound technologies**. Technology can improve the quality of available information and make that information more easily accessible for decision-making. Significant challenges remain with regard to building capacity to develop and use new technologies. At the same time, precautionary approaches may be warranted when uncertainties remain on the effects of the introduction and widespread use of new technologies.

Furthering the use of markets and technologies would most effectively proceed hand in hand with **strengthening environmental governance** in the context of political globalization. Success stories on tackling global environmental problems exist, but much progress remains to be made with respect to putting environment at the centre of the sustainable development agenda. At all levels and across all sectors, recognition of the importance of ecosystem services for human well-being is critical. **Partnerships including civil society and business and industry** are an essential complement to strengthened governance.

What is needed, ultimately, is an intelligent globalization path—grounded in the will to transform innovative ideas into practical realities and predicated on the respect for nature and common humanity that unites us all.



Tourists enjoying a bike ride take in the sunset at Mashatu Game Reserve Botswana

Source: Still Pictures

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