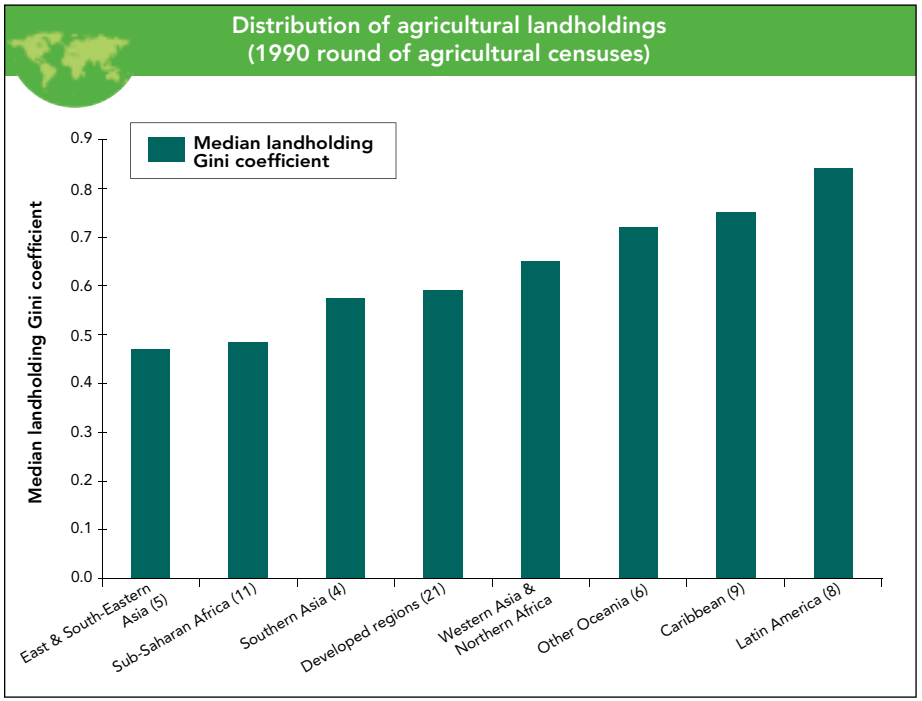
LAND

Access to and distribution of agricultural land



Source: FAO online agricultural census data.

Note: The numbers in parentheses indicate the number of countries from which medians were obtained. FAO defines an agricultural holding as an economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production purposes, without regard to title, legal form, or size.

Land distribution remains highly unequal in some regions

The Gini coefficient measures inequality or concentration in a distribution, in this case of land. It is defined as a ratio with values between 0 and 1, where 0 corresponds to perfect equality and 1 to perfect inequality.

Latin American countries tend to have higher inequality in agricultural land distribution than other regions. The low median value for sub-Saharan African countries suggests that low land inequality per se does not lead to high agricultural productivity. If, however, Africa were to experience an agricultural technology revolution, the benefits could be widely shared.

When other influences on land productivity are accounted for, the degree of land inequality is found to be negatively related to agricultural land productivity at the macrolevel. This suggests that the distribution of land within countries is not optimal and land markets are not functioning properly.[27]

Beyond agricultural productivity, land inequality has been shown to have a negative impact on other key aspects of economic development—education, institutions and financial development—and on poverty.[28]

Land as a resource base

Land degradation in all its forms is a threat to food production and rural livelihoods, especially in the poorest areas of the developing world. Existing estimates of the current global extent and severity of land degradation should be considered indicative at best. According to the 1991 Global Land Assessment of Degradation (GLASOD), based on expert opinion, nearly 2 billion hectares worldwide (22 per cent of all cropland, pasture, forest, and woodland) have been degraded since the 1950s. Africa and Latin America appear to have the highest proportion of degraded agricultural land, and Asia has the highest proportion of degraded forest land.[29]

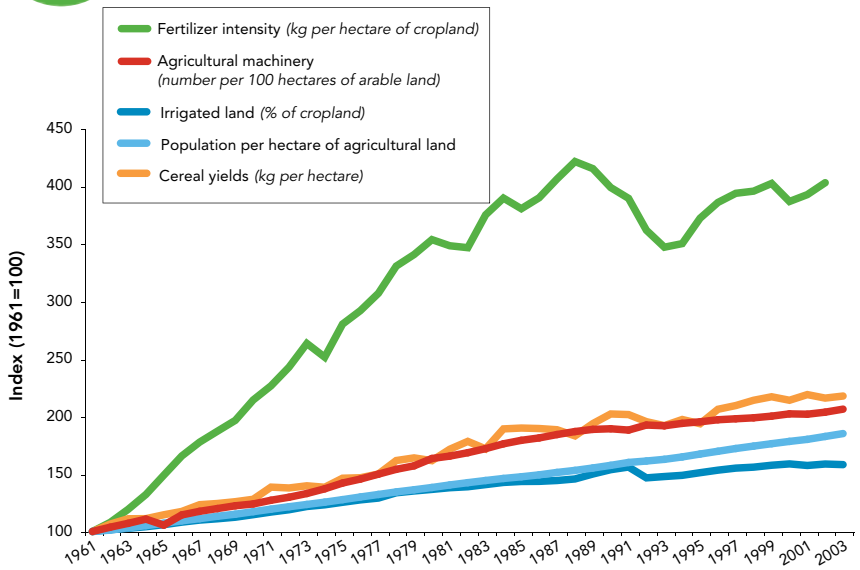
Nevertheless, much agricultural production is sustainable, and in some cases large areas have been under continuous cultivation for centuries, if not millennia. Some land degradation in rural areas has little to do with agriculture. Logging, mining and tourism also degrade land through deforestation, conversion of natural ecosystems, and pollution.[30]

Productivity growth of high-input agriculture has slowed down

Most of the increase in agricultural production over the last four decades can be attributed to "Green Revolution" technologies—including high-yielding cultivars, chemical fertilizers and pesticides, and irrigation—and mechanization. Global fertilizer consumption increased from 23 kilograms per hectare of cropland in 1961 to 92 kg per hectare in 2002, and the share of global irrigated land increased from 12 to 19 per cent over the same period.[31]

Yield growth has slowed down, and modern inputs have caused environmental damage in many regions, including degradation of water quality due to chemical pollution, salinization due to irrigation, and loss of biodiversity as a result of habitat destruction, including of pollinators that are critical to agricultural production. Many insect pests and some weeds have evolved pesticide resistance, while promotion of high-yielding cultivars and livestock breeds has substantially reduced agrobiodiversity, increasing vulnerability to pests and diseases (e.g., in Sri Lanka, the number of rice varieties decreased from 2,000 in the 1950s to fewer than 100 today).[32]

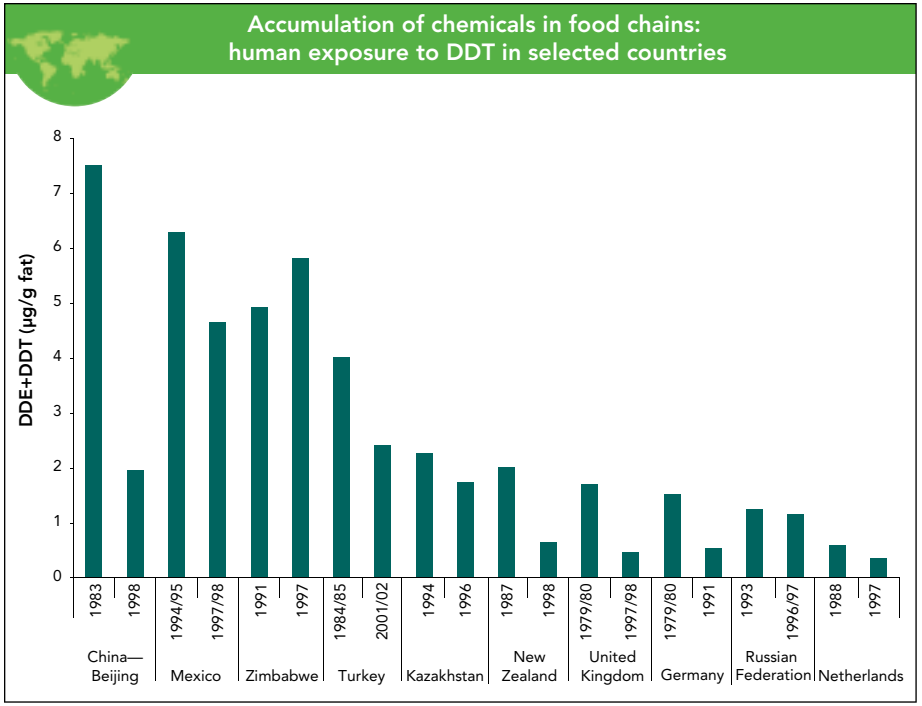
Trends in global intensification of agricultural production, 1961-2003



Source: World Bank (2007) and FAOSTAT archives.

Note: Agricultural machinery refers to the number of wheel and crawler tractors (excluding garden tractors).

> "Changes in land cover, driven by the way people use land, are perhaps the most important single change in terrestrial ecosystems . . ."

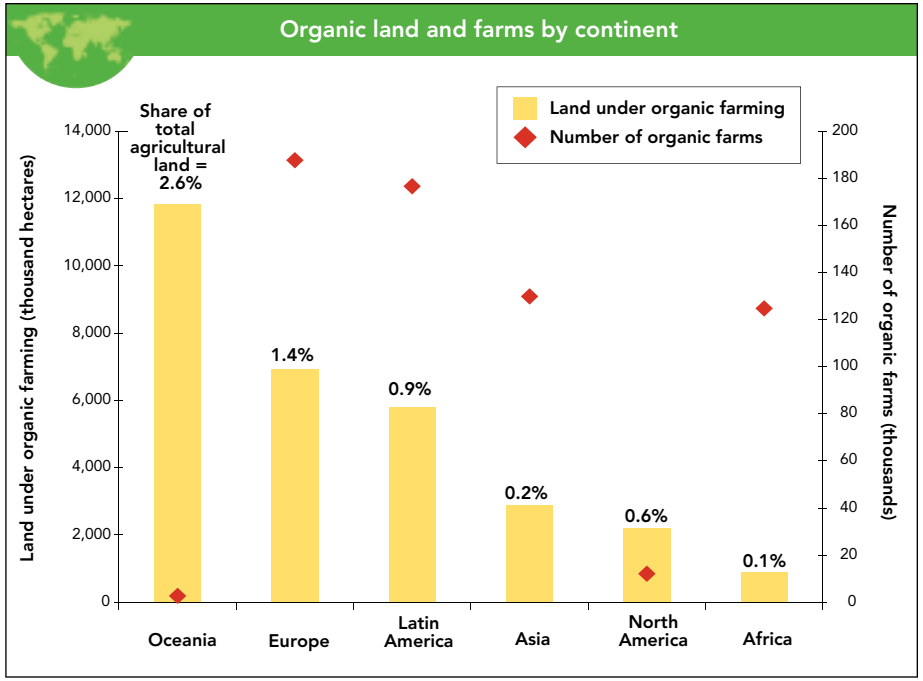


Source: Wong and others (2005).

Note: Human milk is considered to be a reliable means for measuring human exposure to the fat-soluble POPs, including POP pesticides.

Increased awareness regarding the detrimental effects of DDT has led to its elimination in many countries

Some pesticides accumulate in food chains and surface waters for long periods. The 2001 Stockholm Convention on Persistent Organic Pollutants (POPs) seeks the elimination or restriction of production and use of all intentionally produced POPs, but some remain popular as agrochemicals in developing countries, and DDT use for malaria control is allowed under the Convention and is still widespread in poor countries like Zimbabwe. Globally, the decline in DDT levels in the human population is the result of lower utilization following its ban as an agrochemical in many countries. The total usage of DDT in European countries decreased from some 28,000 tons in 1970 to zero in 1996. In Mexico, DDT use has been restricted since 1990. In China, the ban on DDT production and agricultural use was enforced in 1983.[33]



Source: IFOAM and FiBL (2007) on the basis of SOEL-FiBL (2007) survey data.

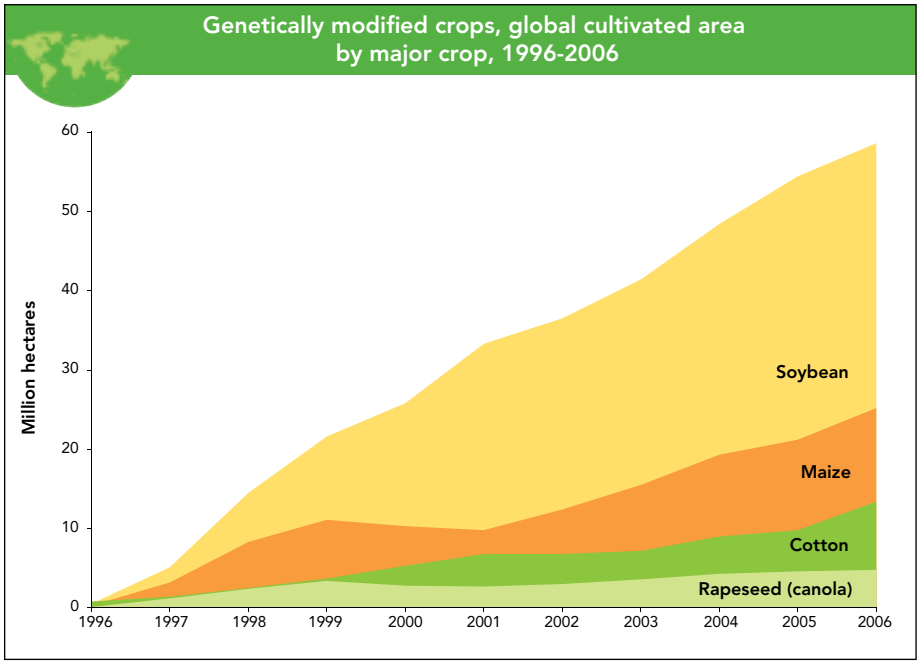
Note: Land under certified organic farming obtained from data published by agricultural ministries and/or as declared by surveyed organizations (e.g., national and international certification bodies). Survey results cover 63 per cent of all countries. Agricultural land includes cropland and permanent pastures.

Land under organic farming is increasing but remains concentrated in a few countries

Almost 31 million hectares are currently managed under organic farming methods by over 600,000 farmers worldwide, or roughly 1 per cent of agricultural land. The region with the most land under organic cultivation is Oceania (basically on account of Australia), followed by Europe (mostly in the EU) and Latin America (mostly in Argentina, Brazil and Uruguay). In terms of number of farms, however, the distribution is slightly different. Most organic farms are located in Europe, followed by Latin America, but Africa and Asia represent one fourth of the total each.[34]

Organic agriculture has a smaller adverse impact on the natural resource base, ecosystems and the health of agricultural workers than conventional agriculture. In addition, it offers export opportunities for developing coun-

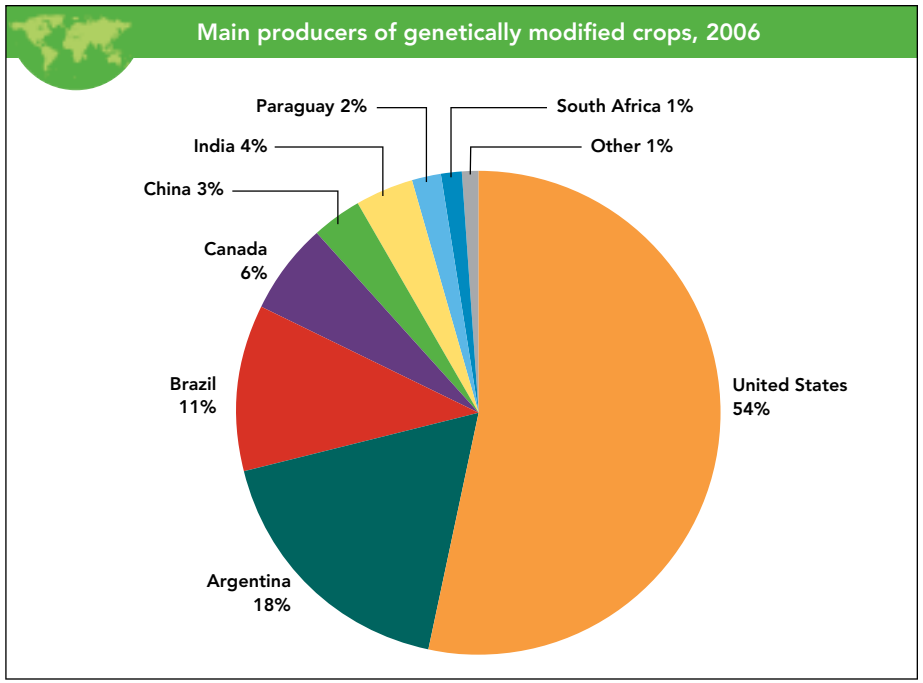
tries, which in many cases have a comparative advantage due to relatively abundant labour supply and low use of agrochemicals. Still, significant challenges face the poorest countries in entering export markets because of the small volumes traded and the substantial investments required in developing certification bodies and securing recognition for that certification in developed country markets.[35]



Source: Based on data from ISAAA (International Service for the Acquisition of Agri-biotech Applications).

Over the past decade, genetically modified (GM) crops have been adopted rapidly at the global level

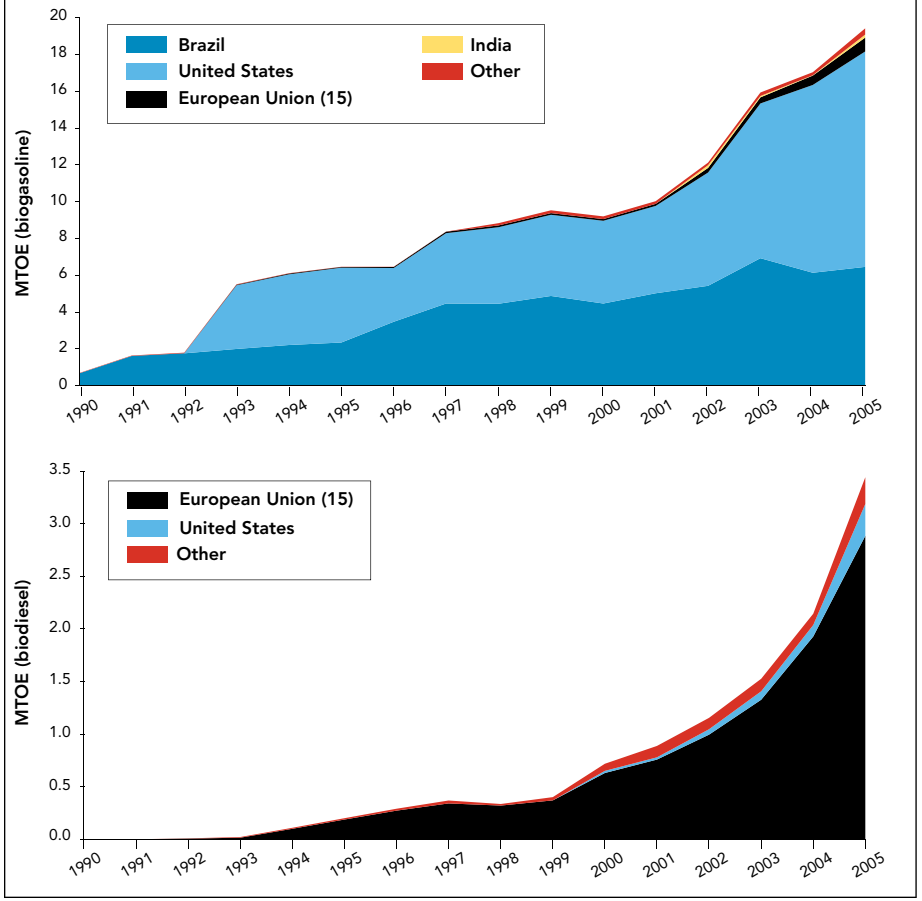
In the developing world, adoption remains limited to a number of middle-income countries. The most widely used GM technologies involve herbicide tolerance (HT) applied in soybean and canola, and insect resistance (IR) applied in maize and cotton. However, the suitability of GM crops remains controversial, both in terms of economic benefits for developing countries and in terms of long-term environmental impact (e.g., from reduced agro-biodiversity and from increased herbicide use).



Source: Based on data from ISAAA (International Service for the Acquisition of Agri-biotech Applications).

Economic returns to adoption of genetically modified crops in developing countries are highly variable. Locally adapted transgenic cotton varieties in China, for instance, compete directly with imported, patent-protected varieties, reducing the seed price for farmers. In Argentina, on the other hand, farmers have to pay significantly higher prices for IR cotton seeds, and as a result adoption rates have been low. In contrast, Argentina is among the largest producers of herbicide-tolerant soybeans, which are not patented locally.[36]

World biogasoline and biodiesel production



Source: IEA (2007).

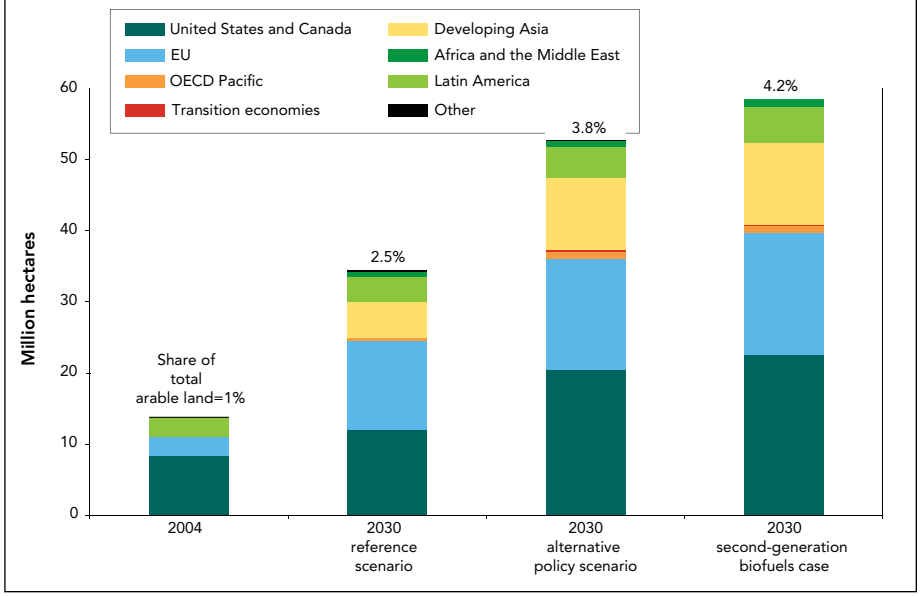
Production of crops for biofuels has increased sharply since the beginning of the 1990s

The agricultural sector can contribute to mitigating GHG emissions through the production of biofuels, although net effects are highly dependent on the type of feedstock used, methods of cultivation and conversion technologies, and full life-cycle emissions from farm to fuel tank.

Subsidies for biofuel crop production and regulations mandating increasing levels of biofuels in road-transport fuel mixes are being put in place, while barriers to cheaper imports through tariffs and discriminatory domestic taxes are restricting access of developing countries—some of which are highly competitive in biofuel production—to several major OECD markets.[37]

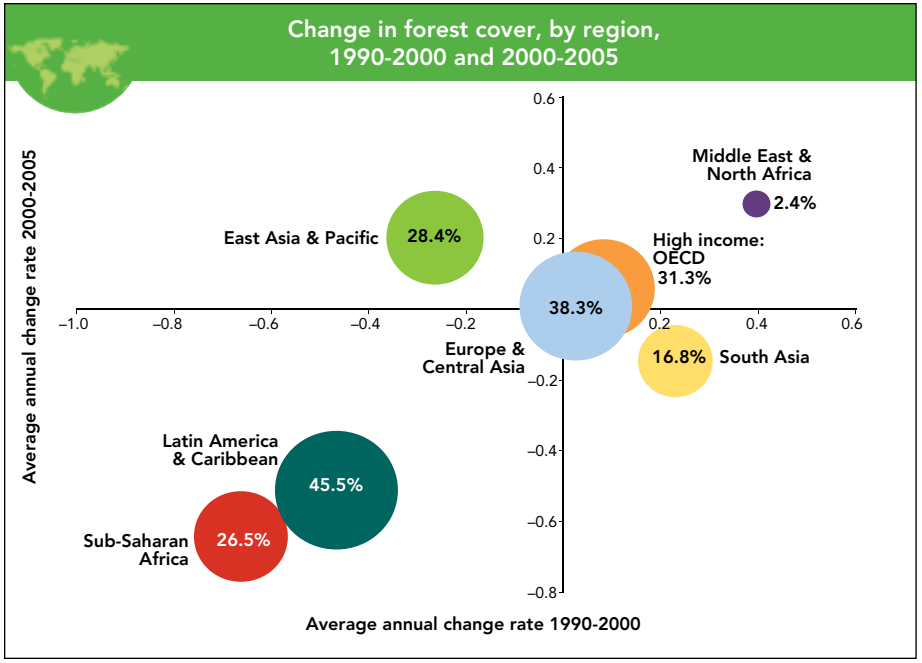
Expanded biofuels production can have serious local environmental impacts, including degradation of soils and deforestation. Also, biofuel production is already pushing up certain food crop prices.[38]

Current and projected land requirements for biofuels production in main producing countries (under three different policy scenarios)



Source: IEA (2006).

Note: Alternative policy scenario includes policies currently under consideration around the world to promote production and use of biofuels; second-generation biofuels case assumes large-scale introduction of ligno-cellulosic technologies, raising biofuels share in transport demand to 10 per cent globally by 2030.



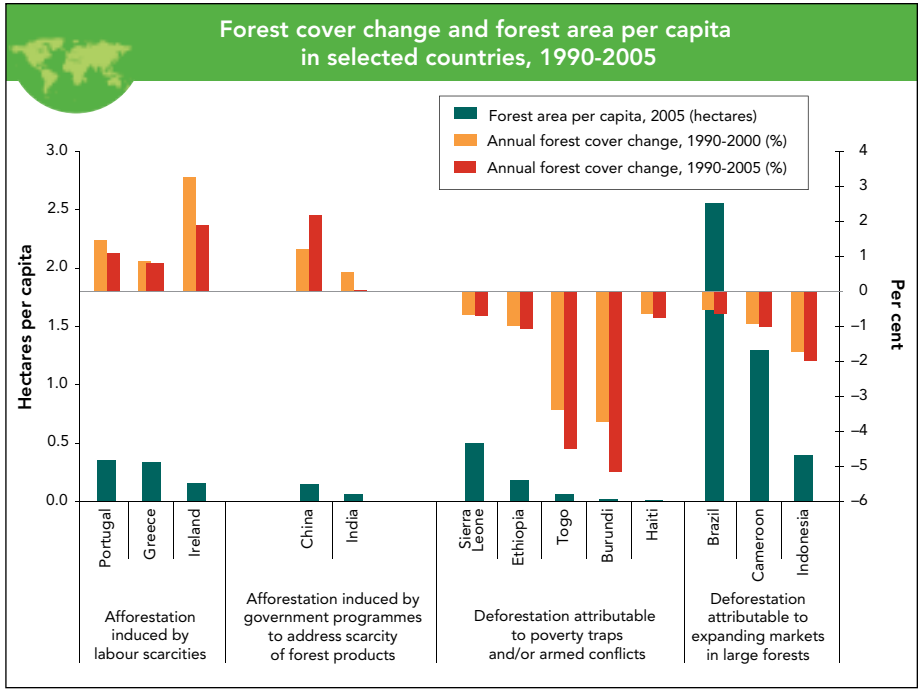
Source: World Development Indicators online database.

Note: Size of bubbles corresponds to forest area as a percentage of total land area. Forest area is land under natural or planted stands of trees.

Global forest cover continues to experience a net decline

Between 1990 and 2005, global forest cover decreased by approximately 1.3 million square kilometres, a 0.2 per cent average annual loss, with the largest absolute net losses taking place in Indonesia and Brazil. There are, however, substantial differences between regions, and between the first decade of that period and the last five years. The highest rates of net loss in forest cover are found in sub-Saharan Africa and in Latin America and the Caribbean, which was the region with the largest share of forested area in the world in 2005. In sub-Saharan Africa, although the rate of loss declined slightly in recent years, there are only a few countries in which forest cover is increasing.[39]

In East Asia and the Pacific, there has been a recovery in forested area in the 2000-2005 period, mainly as a result of the substantial increase in forest cover in China. The net increase at the regional level is built mainly on large investments in forest plantations in several countries, while natural forest area continues to decline.[40]

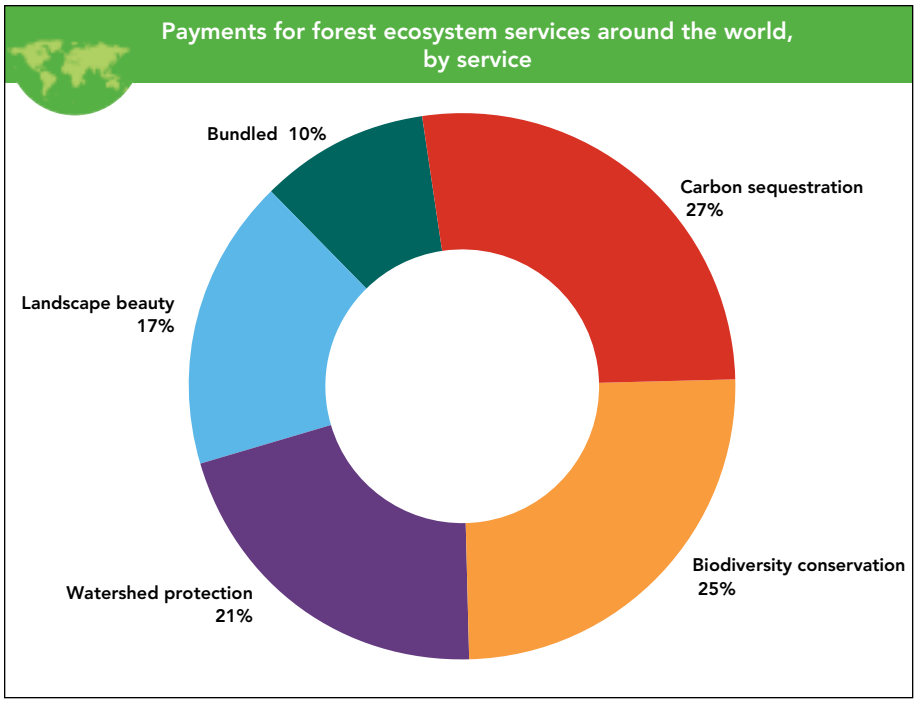


Source: Categories based on Rudel and others (2005) and data from the World Development Indicators online database.

Trajectories of forest cover change vary widely

Over the past 15 years, forest cover has expanded in two groups of countries—those where rural labour shortages due to growth in non-farm employment and rural-to-urban migration have caused some lands to be converted back from farms (e.g., in Europe) and those where government programmes have strongly promoted afforestation in response to timber product shortages and serious flooding due in part to deforestation (e.g., China and India).[41] The Chinese Government's Upland Conversion Programme has resulted in extensive tree plantations.

Meanwhile, another two groups have seen significant forest area decline—poor, land-scarce countries (e.g., Togo, Burundi and Haiti) and countries with large per capita forest endowments and profitable forestry industries (e.g., Brazil, Cameroon and Indonesia). In the first group, farmers without access to technology, capital or markets could not improve land productivity and hence expanded the area under cultivation. In the latter, secondary forests and plantations have increased, but only partially offset the decline in old-growth forests.[42]



Source: Landell-Mills and Porras (2002).

Note: The breakdown is based on a total of 287 cases.

> "Land degradation control has major global benefits . . . as the vehicle to a future with conservation of biodiversity, control of climate change and prevention of land degradation simultaneously achieved."

The use of innovative instruments to address deforestation and its root causes is increasing

The decline in forest area calls for revising widely held views on conservation and land-use policy. New research suggests that reserve areas established for indigenous peoples are as effective as uninhabited nature parks in preventing burning and clear-cutting.[43]

Innovative instruments, such as payments for ecosystem services, are being more widely used to conserve forests, recognizing their watershed, biodiversity and carbon sequestration value. Payments may come from downstream users of those services, conservation groups, tourists, governments or others. Payments for forest conservation have started to be used in the State of Amazonas in Brazil as one measure in the package under its 2007 Climate Change Law.[44]

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