

A *cost-benefit analysis of the Clean Air Act* for 1990-2010, which the EPA presented to Congress in 1999, projected that the direct costs to industry of the Act and its amendments during the period would be one-fourth the value of the benefits (mainly avoided premature mortality and health costs) (Table 2.3). A separate analysis estimated the net benefit to the economy as a 2% increase in real consumption and income. While some uncertainties and challengeable assumptions underlie these estimates, cost-benefit analyses have generally concluded that the direct costs of implementation are around USD 20-30 billion per year (i.e. 0.2-0.3% of GDP) and that the economic value of the benefits to public health and welfare exceed the costs. A 2003 report by the Office of Management and Budget found that the Act had by far the highest ratio of benefits to costs of all economically significant legislation since 1994. According to EPA cost-benefit analyses, the recent tightening of air quality standards for PM<sub>2.5</sub> and ground-level ozone, as well as recent rules for stationary and mobile sources, are expected to continue to produce benefits that substantially exceed costs.

#### *Protecting visibility in natural areas*

Amendments to the Act in 1977 established a national goal of *preventing and remedying visibility impairment* due to anthropogenic pollution in Class I areas, which include most national parks and wilderness areas. The 1990 amendments placed additional emphasis on regional haze. The 1999 Regional Haze Rule establishes a 60-year programme to restore natural visibility conditions in 156 natural areas. Provisions of the Regional Haze Rule require emission controls known as “best available retrofit technology” (BART) for industrial facilities emitting air pollutants that reduce visibility (e.g. PM<sub>2.5</sub>, NO<sub>x</sub>, SO<sub>2</sub>, VOCs). Together with the Clean Air Interstate Rule and continuing work by regional planning organisations, BART standards established in 2005 are expected to lead to visibility improvements.

Table 2.3 **Costs and benefits of implementing the Clean Air Act, 1970-2010**  
(billion USD)

		1970-90	1990-2010
Cost <sup>a</sup>		523	180
Benefit <sup>b, c</sup>	Low	5 600	160
	Central	22 200	690
	High	49 400	1 600
Net (benefit-cost) <sup>c</sup>	Low	5 100	-20
	Central	21 700	510
	High	48 900	1 400
Ratio (benefit/cost)	Low	11	< 1
	Central	42	4
	High	94	> 9

a) Estimated monetised direct costs; net present value in 1990 USD.

b) Estimated monetised direct benefits (net present value in 1990 USD), based on assumptions about future changes in factors such as consumption patterns, input costs and technological innovation.

c) Low and high estimates correspond to 5th and 95th percentile results from statistical uncertainty analysis, incorporating uncertainties in physical effects and valuation steps of benefit analysis.

Source: Adapted from "The Benefits and Costs of the Clean Air Act, 1990 to 2010", EPA, 1999.

### 2.3 *Visibility and ecosystem damage in natural areas*

*Haze*, a form of visibility impairment caused by the presence of fine particles in the atmosphere, is a common phenomenon. Although most severe in the East and California, it is encountered episodically throughout the country. Affected areas include many national parks and wilderness areas. Some visibility impairment is natural (for example, from wind-blown dust or wildfires). Much, however, is due to pollution: emissions of particulates, SO<sub>x</sub>, NO<sub>x</sub> and certain VOCs. Overall *ozone concentrations* have increased in a majority of the 24 national parks where monitoring is done, and foliage damage has occurred in several.

Building on the 1977 and 1990 amendments to the Clean Air Act, the EPA issued its *Regional Haze Rule* in 1999, and established a 60-year programme to return 156 areas to natural visibility conditions. States, in co-ordination with the EPA, the National Park Service, the Fish and Wildlife Service, the Forest Service and other interested parties, are to develop and implement SIPs no later than December 2007, outlining measures for achieving visibility goals. A principal element of the Regional Haze Rule is its requirement that the *best available retrofit technology* be installed at certain sources that began operating between 1962 and 1977 and have a potential to emit more than 250 tonnes per year of visibility-impairing pollutants. Five regional planning organisations, funded by the EPA, are helping co-ordinate efforts among states and tribes. Since 1999 these organisations have evaluated technical information to better understand how states and tribes in their regions affect national park and wilderness areas across the country. The organisations are developing regional strategies to reduce emissions of PM and other pollutants contributing to haze.

In 2001 Massachusetts introduced a *pesticide tax*, using the proceeds to promote integrated pest management. Also in 2001 Oklahoma began providing poultry farmers with incentives to sell manure as fertiliser rather than disposing of it near waterways; buyers of the manure can claim a tax credit of USD 5 per tonne. Most states, however, use economic incentives rather than fiscal instruments to deal with agricultural pollution. At the federal level, water pollution by agriculture is mainly addressed through voluntary *agri-environmental incentive programmes*. For instance, the Conservation Reserve Program (CRP, in existence since 1988) aims to remove highly erodible land from production and the Wetlands Reserve Program (initiated in 1993) to convert farmland to wetlands, for up to 30 years. Both of these programmes, under the US Department of Agriculture (USDA), involve annual payments to farmers. Payments under the Environmental Quality Incentives Program (EQIP, launched in 1996) defray costs of adopting sustainable farming practices and providing wildlife habitat (Chapter 4). In addition, cross-compliance provisions stipulate that, to receive income support under commodity programmes, farmers must

not cultivate highly erodible land or drain wetlands. A CRP project begun in 2004 in New Jersey involves paying farmers “rent” for 10 to 15 years to plant 120 km<sup>2</sup> of trees and grass along streams. The aim is to restore ecological functions so as to improve water quality and provide critical habitat for wildlife.

In the 1990s farms received around USD 1.9 billion per year under agri-environmental programmes, *largely under the CRP*. The agri-environmental payments have since increased, reaching USD 3.0 billion in 2004, and are expected to increase further (Table 3.3). There is less emphasis on programmes for retiring land from crop production and more on programmes supporting conservation on land in production. From 2000 to 2004, budgetary transfers to the CRP increased by 18%, and transfers to EQIP more than quadrupled. Overall the share of agri-environmental payments in total budgetary payments to farmers increased from 5% in 2000 to 10% in 2004.

Table 3.3 **USDA agri-environmental programmes, 2000-06**

(USD million)

	2000	2001	2002	2003	2004	2005 <sup>a</sup>	2006 <sup>b</sup>
Conservation Reserve Program	1 530	1 657	1 785	1 789	1 799	1 937	2 021
Environmental Quality Incentives Program	174	198	390	331	904	995	1 000
Wetland Reserve Program	177	174	284	309	285	268	321
Wildlife Habitat Incentives Program	0	13	15	24	38	47	60
Agricultural Management Assistance Program	0	8	7	1	14	13	0
Agricultural Conservation Program	4	2	1	0	0	0	0
<b>Total</b>	<b>1 885</b>	<b>2 052</b>	<b>2 482</b>	<b>2 454</b>	<b>3 040</b>	<b>3 260</b>	<b>3 402</b>

a) Estimate.

b) Provisional.

Source: USDA.

## 3.2 Water pricing

### *Households and industry*

The US water industry is highly diversified and fragmented, with some 161 000 public water supply utilities, including 53 400 municipal water systems serving 273 million people and 107 800 non-municipal systems serving 30 million people. Not surprisingly, a *wide range of pricing structures* has evolved, with water prices generally lower for business than for households. Nearly 85% of US households are served by public water supply. In 2001 the EPA estimated that USD 150 billion would be needed over the following 20 years to improve infrastructure to assure safe drinking water.

Despite the OECD recommendation to *move towards greater use of public-private partnerships* and a 1992 executive order directing federal agencies to remove obstacles to privatisation, the proportion of customers served by private utilities has remained low, around 15%, since the Second World War. Compliance challenges have prevented the establishment of new water systems that lack technical, managerial or financial capacity. The EPA Drinking Water State Revolving Fund, set up under the 1996 Safe Drinking Water Act amendments, has encouraged the *consolidation of small water utilities*, and the number of community water systems has decreased by 10% in the last decade, though it is still very high.

Despite the OECD recommendation to strengthen application of the user pays principle, the *federal government continues to provide significant financial support for water supply infrastructure development*, particularly in the interest of extending service to and assuring adequate drinking water quality for small communities. Since 1940 the USDA Rural Utilities Service has provided loans, grants and loan guarantees (about USD 1.3 billion a year during the review period) for *water supply*, waste management and storm drains in areas and towns of 10 000 or fewer people. The aid is targeted to public bodies, non-profit organisations and Indian tribes. Some

states have also supported development of water supply infrastructure for low-income communities. The Drinking Water State Revolving Fund, modelled on the clean water fund, enabled states to offer grants and subsidised loans for capital investments totalling USD 6.4 billion (including USD 5 billion in federal capitalisation grants) between 1997 and mid-2003. A further USD 1.6 billion from federal appropriations, state matching funds and loan repayments was available for additional loans. States can use a portion of the funding to comply with such Safe Drinking Water Act goals as source water protection, capacity development and operator certification.

The marginal costs of meeting increasing water demand have spurred efforts to *strengthen the conservation signal in water pricing*. Almost all water networks now meter consumption and charge in relation to volume consumed. In New York City the spread of metering has been accompanied by a 15% decline in water consumption over the past ten years. About 25% of utilities have switched from decreasing-block to increasing-block tariff structures over the past two decades to encourage water conservation. Each of these tariff types now accounts for nearly one-third of household water tariff structures, with uniform volumetric pricing accounting for almost another third. In regions with a large industrial base and plentiful water resources, such as the Midwest, increasing-block structures have faced considerable resistance. They are more prevalent in the West, including for industry. Most major Western cities have adopted seasonal rates. Generally, however, *water services remain underpriced* (Box 3.2), and water consumption high. Water prices will have to increase to cover repeatedly deferred, increasingly necessary capital investment. For instance, many pipes are 50 to 100 years old.

### *Agriculture*

The 1902 Reclamation Act provided for the establishment within the DOI of a *Bureau of Reclamation* to build dams, canals and other water projects west of the Mississippi River, primarily for irrigation and electricity (often used to pump water). In recent years the bureau has spent some USD 300 million per year to build, operate and maintain irrigation works for agriculture, down from USD 500 million in the early 1990s.

In general, *irrigation water pricing in federal projects does not aim for full cost recovery*. Reclamation law requires repayment or return of all actual costs, both for construction and for operation maintenance, allocated to irrigation. However, contracts for repayment of construction costs are often set so as not to exceed “ability to pay”, and long-term low- or no-interest loans are available to cover the charges. The Bureau of Reclamation still serves as water wholesaler for about 25% of the West’s irrigated area, and its delivery contracts with irrigation districts fix quantities and prices for periods up to 40 years.

Nevertheless, some efforts have been made to *increase prices of irrigation water* as the OECD recommended in 1996. California's 1992 Central Valley Project Improvement Act established mandatory increases by introducing tiered rates: the most expensive tier, covering water consumed above the 90th percentile of the volume specified in the contract, is charged at full cost recovery. The Act also places a maximum term of 25 years on renewed supply contracts. Other initiatives, designed to raise charges for groundwater, have recently taken effect in Arizona and some Central Plains states.

### Box 3.2 **Drinking water supply in Southern California**

The Metropolitan Water District of Southern California (MWD) owns and operates the Colorado River Aqueduct, which until recently had diverted 1.5 billion cubic metres of water annually from the Colorado River (under the 1922 Colorado compact) and, since 1970, 5 billion cubic metres from the Sacramento River basin in Northern California to supply 26 cities in Southern California. A drought in Northern California from 1987 to 1992 led to a decision in 1998 to reduce water transfers to Southern California by 30% (50-70% in dry periods) until 2020. Transfers from the Colorado River also had to be reduced, to the minimum agreed in the compact, to meet growing demand from Nevada and Arizona. Overall, *long-distance water transfers were reduced* from 6.5 billion to 4.6 billion cubic metres, and will be further reduced to 4 billion (1.7 billion in drought years) by 2010. That is not enough to meet the current needs of Los Angeles and San Diego, not to mention their expected population increases of, respectively, 25% and 30% by 2020.

Conflicts have arisen between Los Angeles and San Diego over sharing the increasingly scarce resources. Since 1990, MWD has increased its water prices by 75%, to USD 0.28-0.33/m<sup>3</sup>, but the prices remain low, though they should continue to increase with planned supply restrictions. MWD supplies 95% of San Diego's water and an increasing share of LA's supply, particularly since 2001 when LA was required on environmental grounds to halve for 20 years the amount of water it transports in its aqueducts. Now both cities have revised their water supply strategies. *Demand-side management* has brought good results, especially since the initial water consumption level was high, partly because of gardening and swimming pool uses. However, water charges as a proportion of household income are still low and LA's water demand in 2000 was equivalent to 1985 levels. To limit consumption, both

cities have adopted progressive tariff structures, though their average drinking water prices (USD 0.42/m<sup>3</sup> in LA, USD 0.54/m<sup>3</sup> in San Diego) are still low by OECD standards. Financial incentives encourage use of ultra-low-flush toilets and water-efficient washing machines. Further water savings forecast by 2020 would meet the needs of one-third of LA's added population and one-fourth of San Diego's; thus, despite the progress, the expected *demand by 2020* is far from being met. For instance, San Diego planned a 4% annual increase in water prices to 2007, but in a drought daily household consumption would have to be halved to 300 litres per capita. Prices need to be set not only to recover supply costs but also to capture resource rent. Price structures should be much more progressive and provide for huge temporary rate increases during droughts. If water demand in the two cities, now around 600 litres per capita daily, were to decrease to the average daily level in Japan or Europe (180 litres per capita), MWD would be able to supply both cities until 2020, even during dry years.

*Water markets* could also play a role, particularly in San Diego, given its high reliance on MWD water. Trade started when the state established the Drought Water Bank in 1991 to limit restrictions on urban supply. The 1996 California Water

Transfer Act amended the water code to provide a clear set of water transfer rules. Water companies, including the Los Angeles Department of Water and Power and the San Diego Water Authority, may buy water from irrigation districts via annual contracts and pay MWD to transport it. Even though prices have doubled since trading began in 1991 (the price on the spot market, including transportation to LA, is now USD 0.27/m<sup>3</sup>), the water is still cheaper than MWD water, especially since MWD adopted progressive tariffs in 2003. Long-term reliability of supply remains a problem, however; in the past decade the amount of water unused by agriculture and available for trade in Southern California has ranged from zero to some 600 million cubic metres. The variation will continue, as the amount unused depends on economics, type of crops planted, area irrigated and water use efficiency. To establish long-term contracts would require amending long-standing provisions on *allocation among urban uses and irrigation*. For instance, when the San Diego Water Authority sought to conclude a 45-year contract with a major Colorado River irrigation district, the EPA carried out an environmental impact assessment in 2002 revealing that diverting the water to urban uses would significantly increase the salt concentration in the Salton Sea, a key wildlife habitat, and necessitate preservation works costing USD 1 billion.



*Recycling of treated waste water* for gardening and some industrial uses has been done experimentally for years in Southern California. In 2000, LA set ambitious goals for such recycling. Since 2003, however, water companies have had to pay the full treatment cost: the state Wildlife Management Division ceased subsidies introduced in 1995, and recycled water became more expensive (USD 0.26-0.68/m<sup>3</sup>). The US Geological Survey estimates that 3-5% of waste water is now recycled. *Seawater desalination*, meanwhile, is becoming more cost-effective. An experiment in Tampa Bay, Florida, recently produced freshwater for USD 0.61/m<sup>3</sup>. Desalination has the advantage of increasing the amount of available resources and producing drinking water.

### 3.3 *Water trading in the West*

#### *Situation*

West of the Mississippi River, *water rights are legally complex* (Box 3.3). They have many foundations: Spanish colonial law (e.g. in Colorado, New Mexico and Texas); prior appropriation, or “first in time, first in right”, the prevalent doctrine in the West, later complemented by water codes defining allocation procedures as in California’s 1914 code; English common law giving landowners certain access rights (riparian use); and Indian traditional rights administered at the federal level. Several states, most notably California, use a dual system combining riparian use and prior appropriation. Any change in use, season of use or point of use requires an environmental impact assessment. Within irrigation districts, an individual owner needs approval by the district before selling water quotas for external uses.

Water trading requires clearly defined *property rights and institutional structures* to facilitate trading and protect third parties. The extent and magnitude of regulations governing water transfers may depend on the circumstances. For example, in California the State Water Resources Control Board regulates water rights allocation. The state sets transport (wheeling) fees for water transferred from Northern California by the State Water Project. The fees, paid by water buyers, can be based on average or marginal cost, at the state’s discretion, and may or may not include leakage costs. The fees may thus create incentives or disincentives for water transfers. During

droughts, the governor may set up a pool of affected municipalities and, on their behalf, directly buy water unused by agriculture and available for trade. Such a case in 1991 led to the founding of an emergency water bank to avoid speculation.

While several Western states have facilitated large trans-basin transactions, *water transactions in California have remained largely marginal and local* despite conditions that would seem to favour trade: high water consumption by the state's 33 million people and 38 000 km<sup>2</sup> of irrigated land, a large water supply due to inter-basin transfers, growing urban demand, the possibility of efficiency gains from irrigation (which accounts for more than 80% of consumption) and high storage capacity in the Central Valley aquifer and artificial reservoirs. Though the water market in California (in the form of groundwater banking, internal district transfers, transfers between districts and purchases of water for environmental purposes) has expanded substantially since the early 1990s, both in ease of trading and volumes traded, water trading in the state accounts for less than USD 100 million per year, or less than 2% of the USD 6 billion in annual revenue overall from charges for drinking water (excluding sewage treatment) and irrigation water. Trading among farmers amounts to about 1 billion cubic metres per year, while some 250 million cubic metres is traded annually between farmers and urban users (less than 3% of the water supply in each case). The price of purchased water has ranged from USD 0.01/m<sup>3</sup> to sustain minimum river flows in the Environmental Water Account programme and USD 0.04/m<sup>3</sup> for irrigation in the Central Valley to USD 0.08/m<sup>3</sup> for urban uses (raw water) in the Central Valley and USD 0.16-0.20/m<sup>3</sup> for urban uses in Southern California.

Most water transactions involve *annual leases rather than permanent transfers of rights*, partly because of the flexibility thus provided. Most transactions are arranged directly between neighbouring rights holders and thus do not involve change in use or long-distance transport, though public bodies may make more complex direct transactions, such as the long-term lease of 250 million cubic metres per year between a major irrigation district and the San Diego County Water Authority. Traders become involved when there is a need to group several small sellers and put them in contact with remote buyers.

*Examples of trade other than that between farmers* include transactions stemming from local regulations requiring developers to acquire water rights prior to obtaining building permits to guarantee prospective residents a long-term water supply (i.e. for 50 to 100 years). In other examples, private rights holders have built

storage and transport infrastructure so as to sell their water to coastal cities during droughts. The largest such project involves a groundwater bank near Los Angeles under 110 km<sup>2</sup> of arid land, with capacity of 600 million cubic metres, which is recharged in the wet season by water from the Colorado River. The combined use of surface waters and groundwater in projects such as groundwater banks in California's Central Valley and in Arizona enables more sustainable use of surface waters, allowing recharge of aquifers.

There are many examples of *trades whose purpose is to acquire additional water for in-stream flows*. Entities now exist in Western states whose sole purpose is to facilitate trading between agricultural and environmental uses. For example, the Oregon Water Trust has leased and purchased water to increase in-stream flows. While the quantities leased or purchased may appear small, they represent significant environmental improvements.

### *Issues at stake*

Water rights in the West raise several issues (Box 3.3). The rights are to water that is put to a beneficial use in a reasonable time with reasonable diligence. The legal intent of the principle of denying rights to water that is used inefficiently is to remove the incentive for wasteful use. In practice, however, it *can discourage improved efficiency*, as any water saved or salvaged may be deducted from the original right. New appropriations can be initiated only if a stream still contains unappropriated water. Often, finding water that is both physically and legally available requires users to look to distant basins, and, contrary to most water resource management legislation in Eastern and Midwestern states that do not allow inter-basin transfers, prior appropriation *encourages long-distance water transfers*. Many of the West's largest cities, including Los Angeles and Denver, rely on long-distance water imports.

There is *too much focus on supply-side management*. In many regions, concern over drought has led managers to extend water supply far beyond what economic theory or environmental protection would suggest. However, encouraging examples of demand-management initiatives exist in Southern California (Box 3.2).

Prior appropriation is well adapted to handle urban-agrarian conflicts over use, as it allows water and water rights to be moved among users through market exchanges. Water markets can be found throughout the West, particularly in arid regions with strong urban growth. *Prior appropriation is of much less use in reconciling economic uses and environmental protection*. Not only does it generally not recognise any values in, or societal obligations to, the environment, but it can encourage environmental harm by creating incentives for rapid and complete development of water supplies. Water development has fundamentally altered the

quantity, quality and flow of almost all Western rivers, most of which have been dammed. These changes eliminated or modified habitat faster than native species could adapt. The loss of wetlands has been extreme in some cases, e.g. the middle Rio Grande and the Colorado River delta at the Mexican border.

Part of the challenge in protecting and restoring environmental resources has to do with jurisdictional conflicts, as prior appropriation is based in state law (Congress has explicitly stated that the individual states control water allocation) while most environmental protection and water quality statutes are federal. Programmes encouraging people to leave water in streams are layered over state water allocation regimes encouraging maximum diversion and consumptive use. This conflict is further complicated by federal water projects originally designed to serve state water rights holders (mostly irrigators) but increasingly modified to benefit other public uses. The result is an *uneasy coexistence of federal and state law*.

Since most water in the West is used in agriculture, that sector offers the most opportunity for improvement. In most of the region, reallocating just 10% of agricultural water to municipal uses would increase municipal supplies by 50%. By ensuring that *water costs in agriculture* reflect marginal costs of production, as well as the opportunity costs of using water for other purposes (including non-market uses such as environmental protection), it would be possible to cut water consumption significantly and reduce the burden on taxpayers. To the extent that agricultural water subsidies are retained or redirected, they should be used to correct environmental harm.

### Box 3.3 Water rights in the West

The allocation of water among individual users is primarily governed by laws and arrangements crafted by the states. While each Western state has slightly different provisions and administrative arrangements, all have systems based on the *doctrine of prior appropriation*. Priority is based on seniority: senior rights holders are those who established a pattern of water use, as recognised in an administrative permit or judicial decree, earlier than others. When necessary, a senior water right holder may place a “river call” requiring junior right holders upstream to cease diversions until senior users receive their full entitlements. In the marketplace, senior rights are much more valuable than junior rights, since they can be relied upon in drier years when junior rights may prove worthless.

To obtain a water right through appropriation, a water user must identify unclaimed (i.e. unappropriated) water in a stream, develop a structure or system to divert the water physically and *put the waters to a beneficial use*. All appropriation states consider household, agricultural, municipal and industrial uses beneficial. In some recent cases, in-stream and minimum stream flows for environmental and recreational purposes have been included. Once the diverted water is put to a beneficial use, the right becomes absolute and cannot be defeated by later uses even if the latter are considered more valuable. In other words, the first party to divert water and put it to a beneficial use obtains the right to use that water in perpetuity. In dry years there is no rationing among users; the party with the oldest right gets the entire amount of water historically put to beneficial use. Later appropriators receive water only to the extent available in a given year. In California, however, two agreements removed priority of urban districts over irrigation districts for rights in the Colorado River (1959) and the Sacramento River basin (1995). In case of shortage the agreements provide for sharing available resources in proportion to the respective rights.

Water rights acquired through appropriation and officially recognised by permit or decree specify the type and place of use and carry a seniority date corresponding to the date of first diversion and use. They are *quantified based on the initial level of use*, calculated in volumetric amount ( $m^3$ ), flow rate ( $m^3/\text{second}$ ) or both. Rights can also be obtained for water storage, with the understanding that water collected during wet periods will be released and consumed in dry seasons. In some states and some situations, land and water cannot be sold separately, but *generally, water rights can be treated separately from land*. In situations where groundwater is believed to be tributary to surface water systems, it is subject to prior appropriation and administered much like surface water. Non-tributary groundwater is often viewed as belonging to the owner of the overlying land, and is thus not subject to the rules of prior appropriation.

When the federal government withdraws its land from the public domain and reserves it for a specific purpose, it acquires a right on any unappropriated water to the extent necessary to accomplish the purpose. In so doing it acquires a *federal*

*reserved water right* that is superior to the rights of future appropriators. Under this doctrine, the federal government has acquired reserved water rights for national forests, national grasslands, national parks, wilderness areas, wildlife refuges, Indian reservations, military installations and other public lands. Public lands cover about half of the Western states, including over 80% of Nevada and 72% of the Colorado River basin.

Rules governing groundwater often differ from those governing surface water. Five major doctrines apply to *groundwater appropriation*: i) ownership of all groundwater that can be captured, regardless of the impact on neighbouring wells; ii) the “reasonable use” rule, which allows landowners a “reasonable amount” of groundwater for beneficial use on overlying land; iii) a rule prohibiting any use that causes unreasonable harm by lowering water tables, reducing artesian pressure or substantially affecting a watercourse; iv) the correlative rights rule, applied primarily in California, which roughly apportions the amount of groundwater according to the percentage of land owned relative to the total land overlying the aquifer; and v) the prior appropriations rule, which gives priority according to when a well was drilled.

#### **4. Basin-based Management**

##### *Water quality enhancement*

The EPA actively supports *watershed-based trading in water pollution credits*, modelled on the air pollution credit trading developed in the past decade. The agency has supported trading projects through various means, including grants, training and technical tools. A few states and organisations have already applied trading programmes to meet total maximum daily load requirements for watersheds. Since 2003, the EPA has provided a formal federal policy to guide and facilitate the development of such voluntary programmes, in accordance with the 1996 OECD recommendation to use the whole-watershed approach to reduce non-point-source pollution. Allowing factories, waste water treatment plants, farms and other sources of water pollution to *trade pollution credits* is a more flexible, cost-effective way to meet new water quality requirements than simply regulating each facility. Virtually all US trading programmes have provisions to prevent the pollution hot spots that would occur if all dischargers in the same area bought credits instead of making necessary pollution abatement investments.

### Box 3.4 New York City watershed management

Following enactment in 1989 of the federal *Surface Water Treatment Rule* under the Safe Drinking Water Act, New York City embarked on an innovative programme to protect and enhance the quality of its drinking water cost-effectively. The treatment rule requires filtration of all surface water supplies but provides for a filtration waiver if water quality and watershed control criteria, referred to as the filtration avoidance criteria, are met. About 90% of New York City water comes from 200 km away in the upstate *Catskill-Delaware region*, home to 62 000 people, thousands of businesses and hundreds of farms (mostly dairy farms). The city showed that the Catskill-Delaware supply met the water quality criteria (e.g. on turbidity and faecal coliforms), but it also had to demonstrate, through ownership or agreements with landowners, that it could control human activities in the watershed that might have an adverse impact on the microbiological quality of the source water.

For a coalition of watershed towns, key issues were that watershed residents should not pay for New York City to avoid filtering its water and that the city should mitigate the local economic impact of its regulations and land acquisition programmes. In 1997, the city, the state, the EPA, the counties and towns involved, watershed residents and NGOs signed the *New York City Watershed Memorandum of Agreement*. It supplemented the city's existing watershed protection programme with USD 300 million for land acquisition and USD 400 million for partnership programmes. The city provided most of the funds, though federal funds were also involved. Overall expenditure since the city first applied for the filtration waiver in 1991 have come to USD 1.6 billion, compared with estimated avoided filtration costs of USD 6 billion.

*Activities to protect water quality in the watershed* involve participation by municipalities, small businesses and farms. The Catskill Watershed Corporation oversees waste water management (via individual septic tanks and community sewage treatment plants), storage of sand and salt used for winter road maintenance, and soil and water conservation for construction programmes. The Watershed Agricultural Council fosters adoption of farm nutrient management plans and forest management plans (75% of the watershed is forested), and purchases development rights (conservation easements).

*Innovative basin-based management approaches* have been adopted in recent years. One such programme offers incentives for stakeholders upstream of New York City to protect the city's water supply sources from pollution (Box 3.4). Other examples can be found in Boston (mainly involving forest management), Portland, Oregon (to protect salmon), and Seattle, where the watershed is entirely state-owned. Management of the Great Lakes, shared by Canadian and US authorities, is moving in

a similar direction, as is joint management of other cross-border watersheds (Chapter 8). Other difficult management issues concern watersheds shared by Mexico and the United States, including those of the Colorado River and the Rio Grande-Rio Bravo (Chapter 8).

### *Water resource management*

Little has been done to *integrate flood plain management, land use and water policies* as the OECD recommended in its 1996 review, even in the West, where the federal government retains ownership of much of the land unoccupied by settlements, amounting to some 300 000 km<sup>2</sup> of public lands, which federal agencies manage for a variety of uses. Local governments however have main land use planning responsibilities. Hydrological and habitat modification continues to pose significant threats to US water resources, and developers continue to build homes and businesses where risks of devastating floods exist. Coastal populations are increasingly vulnerable to floods and their damage. Emergency response mechanisms may prove to be inadequate.

Nevertheless, some promising initiatives have begun. One example is the Hardwood Tree Initiative, launched in 2003 under the CRP to restore 2 000 km<sup>2</sup> of river flood plains by planting trees. It should help restore critical wildlife habitat while improving water quality, reducing the impact of floods and sequestering over 1 million tonnes of greenhouse gases. Participants in the voluntary initiative, which focuses on the Mississippi, Missouri and Ohio River valleys and the southern coastal plain, receive an annual “rental” payment for 14 or 15 years. NOAA’s Hydrology Program enhances the accuracy and lead time of forecasts and other information provided by hydrologic services: river and lake level forecasts; river and flash flood guidance, watches and warnings; drought forecasts; water quantity and quality information; measured and modelled snowpack information; and precipitation depth-duration-frequency estimates.

Net loss of wetlands has declined dramatically, though it still totalled 240 km<sup>2</sup> per year between 1986 and 1997, the latest year for which data are available (Chapter 4). In accordance with the OECD recommendation to *use the whole-watershed approach to protect wetlands*, the EPA has actively promoted the enhancement of state, tribal and local capacity to evaluate and improve the role of wetlands in river basin management. Several federal agricultural programmes are also designed to preserve wetlands. However, the US Army Corps of Engineers, part of the Department of Defense, can issue wetland filling permits if certain conditions, including environmental conditions, are met. Though the EPA retains enforcement authority in such cases, under certain circumstances the Clean Water Act allows several exemptions from regulation, including for routine farming activities,



maintenance of dams and other infrastructure, construction of farm ponds or roads, and actions authorised by an approved state programme. *Wetland mitigation banking*, practised for more than 25 years, is a concept recently growing in popularity. About 100 mitigation banks are now operating or proposed in 35 states, compared with 40 banks ten years ago. Once federal and state agencies agree that a developer (often a state department of transportation) cannot cost-effectively avoid harm to a wetland, the developer must compensate for the wetland loss by mitigating that loss on its own or purchasing credits in a mitigation bank. Mitigation banks are being used to help finance restoration of other kinds of ecosystems as well. The concept encourages area-wide analysis of mitigation needs, though it should not allow destruction of unique wetland ecosystems. To improve the tracking of wetland programmes, the US Fish and Wildlife Service of the DOI has accelerated completion of the next National Wetlands Inventory and Status Report, now due by the end of 2005 instead of 2010 as originally planned.

*Compacts* provide a means of ensuring that each state is provided with a fair portion of the water supply (Box 3.5). They are among the tools that might be considered in efforts to improve water management. Their relative advantages over

other policy tools depend on a number of factors, including existing institutional structures. In some cases, the existence of functioning water markets may be more important than the development of new compacts. Some compacts in the East involve the federal government and have strong commissions that can help settle disputes and set new allocations; Western compacts might benefit from these examples. Compacts ought to foster river basin management; many of the largest users of Colorado River water, for example (notably Los Angeles), are outside the basin itself. Another need is to reduce inflexibility: compact water rights, for instance, are not marketable. Few compacts in the West include minimum flow or seasonal allocation, most being based on a constant annual amount. In line with the OECD recommendation to *use the whole-watershed approach to protect in-stream flows and aquatic habitat*, only amounts above the minimum ecological flow should be allocated, and apportioning should be based on percentages rather than absolute values. The federal legal basis for preserving in-stream flows includes, most notably, the 1968 Wild and Scenic Rivers Act. For designated rivers, the Act prohibits activities, including logging, water diversion and development projects, that could conflict with a river's wild, scenic or recreational character. Mining based on rights predating a river's designation is allowed. Congress can designate rivers under the Act, as can states (upon DOI approval, if the state agrees to administer the river). Management plans regulating activities on adjacent lands must be developed for rivers designated since 1985.

### Box 3.5 Water allocation among states: compacts

Prior appropriation allows *transfers of water between basins within states*, but different rules apply across state lines. A common approach for resolving interstate water allocation conflicts, used mostly to clear the way for dam-building projects in the West, involves binding *compacts*. The courts have encouraged compacts over judicial proceedings before the US Supreme Court. Twenty-two interstate compacts exist west of the Mississippi River. They were ratified by Congress between 1922 and 1978; only two postdate the 1972 Clean Water Act. More recent compacts in the Midwest and East focus on water quality management, flood control, and planning and project integration.

Several compacts in the West have led to *conflicts*. Examples include three compacts made by Arkansas with Colorado, Kansas and Oklahoma; four compacts made by Colorado with Utah, Arizona, Nevada and California; and the Rio Grande compact among Colorado, New Mexico and Texas. Conflict usually stems from failure to comply with contract terms, incorrect assumptions about precipitation and run-off levels and growth of water demand beyond compact apportionments. Issues have also resulted from the compacts' *narrow focus*. Most fail to consider surface and groundwater connections, Indian water interests, environmental protection, fish and wildlife, water quality, droughts and related emergencies.

#### Box 4.2 **Harnessing information technology to reduce wetland loss**

Wetlands have been federally protected since 1977, when the *Clean Water Act* recognised swamps, bogs and wet forests for their essential ecological roles as wildlife habitats and buffers against pollution and flooding. But most states have found enforcement difficult and expensive, particularly in remote areas. According to the Fish and Wildlife Service, between 1986 and 1997 the lower 48 states experienced a net loss of 2 600 km<sup>2</sup> of wetlands. By 1997 the annual loss had reportedly slowed to 235 km<sup>2</sup>, a big improvement but still far from no net loss, the national goal at the time.

Since 2001 *Massachusetts* has used digitised aerial maps, linked to a computer database, to carry out change analysis and track the status of wetlands. This innovation has improved detection of illegal wetland destruction while lowering surveillance costs. Despite recent budget cuts the state has strengthened its prosecution of violators, with before-and-after photos that are more convincing to juries than paper maps. The system is relatively affordable, as the software operates on personal computers, and it is far more comprehensive than relying on phoned-in tips.

The *Massachusetts* experience suggests that actual *wetland loss rates* may be higher than had been estimated. Despite a traditionally tough stance on enforcing wetland regulations, the state's aerial surveillance had detected illegal draining of hundreds of hectares of wetland per year. In the two-thirds of states that have not traditionally operated formal programmes to enforce wetland regulations, unregistered losses may be even higher. As part of the Fish and Wildlife Service's *National Wetlands Inventory*, some states (e.g. *Virginia*) have started to follow the lead of *Massachusetts*, digitising wetland maps and establishing databases to track wetlands' health over time.

### Box 4.3 Selected economic costs and benefits relating to nature

*Recreational use of wildlife.* Nearly 82 million US residents (39% of the adult population) participate in wildlife-related activities. Some 64 million of them pursue bird-related recreation, such as bird watching, backyard bird feeding, hunting and photography. They contribute to local economies through nearly USD 40 billion (about 0.4% of GDP) spent annually on these pursuits.

*Reef resources.* Coral reefs contribute an estimated USD 375 billion to the economy annually, about 3.4% of GDP. Reefs support important industries: over 50% of federally managed commercial fish species depend on reefs during some part of their life cycle. In the Florida Keys the cost of a proposed waste water treatment plant that would mitigate significant pressure on reefs (USD 60 million in investment and USD 4 million in annual maintenance) was estimated to be outweighed tenfold by the benefits to the local population (estimated net present value of USD 700 million). In Hawaii coastal tourism is tightly linked to coral reefs, which not only provide tourist destinations but also control beach erosion and buffer the land from storms and large waves.

*Invasive species.* The economic cost of invasive species has been estimated at USD 120 billion per year, equivalent to 1.1% of GDP. The USDA Forest Service spends USD 97 million per year to control the introduction and spread of exotic species. The United States and Canada spend USD 14 million per year just to control the sea lamprey, which caused the collapse of two Great Lakes fisheries (lake trout and whitefish). The impact of invasive species has had a major role in the decline of a majority of the plants and animals on the federal endangered species list.

### 3.3 *Integration of nature concerns in sectoral policies: agriculture, forestry, fisheries, mining*

The 2002 *Farm Security and Rural Investment Act* (known as the *Farm Bill*) represents the single most significant US commitment of resources towards conservation on private lands (agri-environmental support). The Farm Bill responds to a broad range of emerging environmental challenges faced by farmers and ranchers, including soil erosion control, wetland conservation, wildlife habitat preservation and farmland protection. Private landowners benefit from a portfolio of voluntary assistance, including cost-share, land rental, incentive payments and technical assistance. The Farm Bill emphasises conservation of working land, ensuring that it remains healthy and productive. Its conservation provisions build on past conservation gains and respond to the call of farmers and ranchers for additional cost-share. The Farm Bill also assures greater access to programmes by making more farmers and ranchers eligible for participation.

*Agri-environmental payments* increased in the review period from around USD 1.9 billion to USD 3.0 billion in 2004 (Table 3.3). They increased as a share of total payments from 5% in 2000 to 10% in 2004. Among agri-environmental payments, those from the Conservation Reserve Program (about USD 1.8 billion in 2004) outweigh those from the Wetland Reserve Program (about USD 285 million in 2004) and those of the Environmental Quality Incentives Program (USD 900 million in 2004).

In the context of the 2002 Farm Bill, the *Environmental Quality Incentives Program* (EQIP) offers financial support for certain structural and management practices on eligible farmland or ranches. It is a voluntary conservation programme promoting agricultural production and environmental quality as compatible national goals. EQIP offers one- to ten-year contracts that provide *incentive payments and cost-share* for conservation practices. Its plan of operations, developed in conjunction with producers, identifies the appropriate conservation practice or practices to address particular resource concerns. EQIP may provide cost-share for up to 75% of the costs of conservation practices, or as high as 90% for limited resource producers and beginning farmers and ranchers.

The 2003 *Healthy Forests Restoration Act* expedites fuel reduction and other forest health projects while assuring the protection of threatened and endangered species. It aims to strengthen public participation in developing high-priority forest health projects; reduce the complexity and redundancy of environmental analyses, allowing federal land agencies to use the best science available to actively manage land under their protection; provide a more efficient appeal process, encouraging early public participation in project planning; and, where courts are asked to halt projects, instruct them to balance the short-term effects of the projects against the harm from undue delay and the long-term benefits of a restored forest. The *National Fire Plan* is intended to reduce risk to communities and natural resources from wild-land fires by rehabilitating, restoring and maintaining fire-adapted ecosystems and reducing accumulated fuel or highly combustible fuel. It is a long-term commitment based on co-operation and communication among federal agencies, states, local governments, tribes and interested members of the public. The *Healthy Forests Initiative*, announced in 2002, implements core components of the National Fire Plan. Complementing the Healthy Forests Initiative and the National Fire Plan, the Western Bark Beetle and Southern Pine Beetle Plans establish a framework for protecting the environment through local collaboration on thinning, planned burns, insect and pathogen suppression and prevention, and forest restoration projects. A USDA Forest Service programme, Forest Health Protection, provides technical information and assistance to federal, state, tribal and private managers of forest lands regarding management and control of forest insects, diseases and invasive plants; forest health monitoring; technology development; and pesticide use.

The Stewardship Incentives Program provides *financial assistance* covering up to 75% of the costs of practices in approved *forest stewardship* plans, to encourage private forest owners to keep their lands and natural resources productive and healthy. Qualifying land includes rural land with existing tree cover and land that is suitable for growing trees and is owned by a private individual, group, association, corporation, tribe or other legal private entity. Eligible landowners must have an approved

forest stewardship plan and own 4 km<sup>2</sup> or less of qualifying land. Authorisation may be obtained for exceptions of up to 20 km<sup>2</sup>. Practices must be maintained for at least ten years.

Stocks of more than half the country's *marine fish species* have been declining in recent years, mostly because of overfishing. The total fish catch has been decreasing since its peak in 1993, with some fluctuation in the last few years; total marine catches exceed 5 million tonnes per year, the second highest among OECD countries. The *Sustainable Fisheries Act* of 1996, which marked a major strengthening of fishery management policy, established new objectives and authorities. The objectives included: i) managing so as to avoid overfishing and to mitigate the adverse effects of fishery operations; ii) developing fishery restoration plans and reducing by-catch; iii) identifying essential fishery habitats and providing needed protection; and iv) involving fishing communities in actions to promote sustainability for fisheries and local economies. Progress under the Act has included: i) designation of rebuilding plans for nearly all overfished stocks; ii) reduction of overfishing; iii) integration of by-catch into overall fishery management, in particular through a national plan to reduce by-catch and related mortality; and iv) reduction of over-capitalisation in several important commercial fisheries in Alaska. Nevertheless, major challenges remain. Data covering 909 stocks show that 76 were overfished in 2003. Of these, 67 are being managed under rebuilding programmes and the rest are either managed under other federal programmes or targeted for future rebuilding efforts. While these data reflect a positive trend towards removing stocks from overfished status and moving towards sustainability, much is still unknown about the status of many stocks (Chapter 8).

*Mining and oil and gas exploitation* in the Eastern and Western US have had severe effects on biodiversity in a number of cases through soil and landscape effects, land fragmentation, water demand, and water and air pollution. The US Toxics Release Inventory shows that in 2002 the metal mining industry released 590 000 tonnes of toxics (27% of all toxics released by US industry), including 174 000 tonnes of arsenic, 158 000 tonnes of lead and 2 132 tonnes of mercury. While the extractive industries are progressing towards more sustainable management of their activities, proposed expansion of operations in certain areas (e.g. expanded oil drilling proposed in Alaska) is a subject of controversy.

### *3.4 Integration of nature concerns in land use planning*

The primary categories of *federal public land* are national forests, national wildlife refuges, national parks and Bureau of Land Management (BLM) lands. Within each of these management categories, there exist some areas designated as wilderness. The

USDA Forest Service and BLM together manage 1.85 million km<sup>2</sup> of public land, almost *one-fifth of the country's total area*. About 1.10 million km<sup>2</sup> is range land and the remainder is forest. The use and conservation of these often fragile lands require a careful balancing of economic interests and ecological constraints. The concept of *multiple use* posits that all uses, from commodity extraction and production to biodiversity conservation, are equal. However, the Endangered Species Act requires federal land management agencies to consult prior to taking an action so as to avoid adversely affecting a listed species. In recent years Congress has increased the planning duties of the primary federal land management agencies, requiring greater consideration of historically neglected environmental values in general, and biodiversity conservation in particular. It is still up to federal land managers, however, to strike the final balance among all possible uses. Both plans and operational decisions may be subject to challenge in the federal courts by those opposed to the outcome.

Use and management of *privately owned land* are primarily governed by state, local and tribal laws. Many state and local jurisdictions have programmes aimed at planning and management for land resources. Most states have laws concerning best management practices to guide forest landowners. Members of the public and NGOs are involved in developing and approving state and local regulations. In addition, over 1 200 private land trusts promote voluntary conservation and preservation. The trusts provide leadership and training to help protect open spaces, wildlife areas, farmland and special scenic, historic and culturally important areas. The federal tax code provides income and estate *tax benefits* for landowners who donate interests in environmentally valuable land to qualified conservation organisations. Reaching an appropriate *balance between the rights of farmers and ranchers* (who control what is on the surface) *and the industries* that own or lease the rights to underground oil, gas and other minerals is a growing concern, especially in the West.

### ***3.5 Role of partnerships and environmental NGOs***

Since 2000 the administration has promoted *co-operative conservation* as a way to leverage citizen involvement to achieve conservation goals. In many cases, activities undertaken to benefit resources on public and private lands have fostered innovative approaches to land use by involving local citizens, who bring a first-hand understanding of the challenges facing specific places. Co-operative conservation seeks to promote a broader-based and more integrated approach to addressing environmental concerns, offering an alternative to mandated approaches, which often lead to conflict or litigation. Over the past five years, the federal government has provided over USD 1.7 billion in grants to states, tribes, local governments and private landowners through programmes that preserve open spaces, restore wildlife habitat and protect



endangered species. Such partnerships have restored millions of hectares of habitat, removed invasive exotic species, replanted native grasses, improved riparian habitat along thousands of kilometres of streams, conserved limited water resources and developed conservation plans for endangered species and their habitat.

The Fish and Wildlife Service, through its *Partners for Fish and Wildlife Program*, has established productive relationships with communities, conservation groups, tribes and over 30 000 landowners, providing them with both financial and technical assistance. Since it began in 1987, the programme has established over 28 000 agreements with landowners, resulting in the restoration of 4 290 km<sup>2</sup> of uplands, 2 628 km<sup>2</sup> of wetlands and 7 516 km of riparian and in-stream habitat. Over 2001-03 the same agency's Coastal Program reached 323 partnership agreements for 870 km<sup>2</sup> of restored and protected wetland. The Environmental Protection Agency's National Estuary Program has also been successful. *Other programmes* assisting owners to improve wildlife habitat on their lands include the Wildlife Habitat Incentives Program, the Conservation Reserve Program and the Wetlands Reserve Program. In addition, conservation programmes such as the Forestry Incentives Program and the Farmland Protection Program have the potential to produce benefits in terms of sustainable fish and wildlife habitat. Since 1996 NOAA's Community-based Restoration Program has also supported local efforts to restore sensitive marine, estuarine and riparian habitats. The programme promotes partnerships at the national and territorial levels, providing funding, technical assistance and in-kind services to engage citizens in such efforts.

*Environmental NGOs* continue to play an important role in US nature protection and management. National organisations include Environmental Defense, the National Resources Defense Council, The Nature Conservancy, the National Environmental Trust, the Sierra Club, the National Wildlife Federation, the World Wildlife Fund and the National Audubon Society. Several have more than 500 000 members. In most cases NGO budgets are financed by donations and membership fees. NGOs often demonstrate capacity for policy proposal and analysis, as well as lobbying and litigation, and may have strong influence in Congress.

#### 4. International Co-operation

The United States's *active international co-operation* relating to nature and biodiversity includes multilateral, trilateral and bilateral arrangements. It is an active party to the 1973 Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Ramsar Convention, for example. It signed the 1992 Convention on Biological Diversity but has not ratified it.

Total *environmental expenditure* was last surveyed in 1999 in the US Pollution Abatement and Control Expenditures survey. A new survey instrument is being designed but is not expected to be ready to use before 2006. The 1999 survey estimated *total spending* by the manufacturing, mining and electricity sectors at USD 17.67 billion (in 1999 USD). Manufacturing bore the largest share (84%), followed by electricity generation (13%) and mining (4%). Some 67% was for operating costs and the remainder was new investment. Of the latter, 60% was for air pollution abatement, and water followed at 31%. Overall, there is no conclusive evidence that environmental expenditure has had a net effect of reducing jobs or the *international competitiveness* of the US economy. The fact that *EPA expenditure* accounts for less than 10% of the country's overall pollution abatement and control expenditure highlights the importance of integrating environmental objectives into other policies.

#### *2.4 Institutional integration of economic concerns into national environmental policy*

While the *EPA* is the main federal agency responsible for environmental protection, many departments share responsibility for policies related to environmental management, including Interior, Energy, Agriculture, Health and Human Services, Defense, Homeland Security, Transportation and Commerce. Under the 1993 Government Performance and Results Act, federal agencies have overhauled their programming systems. *Programme effectiveness* and efficiency are monitored through ex post evaluations of performance in meeting goals and objectives. Feedback from these reviews is valuable for future objective setting.

*Cost-benefit analysis* is increasingly used to integrate economic considerations into environmental policy making, particularly as regards air management and environmental health issues, though less in water, waste and nature management. Executive Order 12866 of 1993 requires cost-benefit analysis for most new federal rules or regulations and stresses that benefits should justify costs. Under the Regulatory Right to Know Act (1999), the Office of Management and Budget reviews the cost-benefit analyses and issues an annual report to Congress. Some key environmental laws, however, mandate the EPA to set environmental standards at levels adequate to *protect human health*; examples are the Clean Air Act and Resource Conservation and Recovery Act. Thus, for waste- and emission-related standards, public health considerations may over-ride cost-benefit analysis as a result of statutory requirements (Chapters 2 and 7). Even so, in recent years renewed emphasis has been placed on choosing the most *cost-effective policy instruments* for achieving health-based standards and ensuring that the benefits justify the costs while satisfying statutory requirements that prioritise health considerations. For example, a cost-benefit analysis of clean air regulations showing that benefits heavily outweighed estimated costs was part of the rationale for further tightening of selected regulations in 2003 (Chapter 2). The EPA plans to make more than 35 programme evaluations by 2008.

Some *improvement to cost-benefit analysis practice*, as the 2000 OECD Economic Survey of the United States recommended, would still be desirable, though there will always be significant uncertainties in valuing costs and, more particularly, benefits. The fact that ex post studies are carried out by the agency responsible for the policy, project or regulation being evaluated raises concerns over conflict of interest, although many such studies are subjected to in-depth external peer review. Better *monitoring and reporting* of the state of the environment would help strengthen assessment of policy costs and benefits, as the EPA noted in its 2003 Draft Report on the Environment. The absence of data and overall understanding of *expenditure on environmental management* by national, state and local governments and the private sector (e.g. business and households) calls into question *strategic priority setting*, particularly in areas such as water, waste and nature management.

## 2.6 *Market-based integration*

### *Sectoral subsidies*

In the transport sector, vehicle use (and hence energy consumption) receives federal support in several ways. Federal *highway and public transport funding* to states supports development and maintenance of roads, highways and public transport

infrastructure. These funds come primarily from fuel and tire excise taxes, conceived as user fees. Some tax exemptions are vehicle-related, including a deduction of up to USD 100 000 per light-duty vehicle (including *sport utility vehicles*) bought for business use, which may distort purchase decisions and lead to increased fuel consumption. Employees who use *employer-provided parking* enjoy a tax preference. The tax deduction for home mortgage interest can be considered an indirect subsidy and may encourage purchases of larger, more energy-consuming dwellings that tend to be farther from urban centres. More generally, *investment in infrastructure*, such as port building and harbour maintenance projects, serves to reduce transport costs and thus influence a range of economic decisions, for instance regarding fossil fuel consumption.

*Energy subsidies* in the United States probably total billions of dollars annually, judging by available estimates. A survey of ten studies of US energy subsidies revealed estimates ranging from USD 6.2-9.6 billion to USD 141-280 billion (in constant 1999 USD). None of these estimates took into account external costs, which

can be considered an additional subsidy. Estimates by the Energy Information Administration are lower, as they are based on a narrower definition of subsidy: direct payments, tax expenditure, R&D expenditure and support to federal power producers.

For the *electricity sector*, the Energy Information Administration estimates that total support amounts to no more than 1% of electricity revenue. However, some subsidies affecting primary energy generation and demand are easily overlooked. For example, a tax exemption for interest on state and local bonds helps finance large capital investments by public utilities. Co-operatives are exempt from income tax because they are non-profit organisations, and they are eligible for low-interest loans from the Rural Electrification Administration. Federal Power Marketing Administrations, which wholesale electricity from federally owned power plants, finance their debt at favourable rates through the Treasury. Such policies lower the cost of electricity production. As wholesale electricity markets become more competitive, however, the effect of these subsidies on electricity prices will likely diminish. Moreover, direct subsidies for capital financing have been reduced in recent years.

*Other energy subsidies* include the *percentage depletion provision*, a significant tax expenditure subsidy (it amounted to USD 840 million in 1999 for fuel). Rather than deducting cost depletion, fossil fuel producers can elect to deduct a certain percentage of gross income from resource production: 10% for coal and (for smaller independent producers) 15% for oil and gas. Owners of coal leases benefit from *preferential tax rates* (amounting to USD 50 million in 1999), and their royalty

income is taxed as capital gain. As capital gains taxes are being lowered, this subsidy will increase. Working interests in oil and gas properties are granted an *exemption from the passive loss limitation* (totalling USD 50 million in 1999), meaning excess losses can be used to offset ordinary income rather than being carried over to offset future passive losses.

The relative tax treatment of *renewable energy sources* has been favourable: in 1999, subsidies accounted for around 26% of prices. Overall, however, renewables receive a minor proportion of total US energy assistance; oil and end-use electricity together make up about 86%. Most aid to renewables goes for promotion of the use of alcohol in motor fuel. Uncertainty over tax subsidy continuation has weakened the effect of recent support for renewables, although state renewable portfolio standards, mandating a minimum percentage of electricity from renewables, have offset this to some extent.

*Agriculture* receives significant subsidies, which contribute to nutrient run-off, overuse of water and biodiversity loss. On the positive side, the 1996 Federal Agricultural Improvement and Reform Act strengthened the link between market conditions and planting decisions by decoupling crop payments from current production and phasing out dairy price supports. However, a series of *emergency assistance packages* between 1996 and 2001 doubled total outlays for farm income stabilisation and led to an overall increase in the US *producer support estimate* over the review period (from 13% in 1996 to 23.9% in 2000 and 18.2% in 2004). While the level of support remains considerably lower than the OECD average, the situation may worsen because the 2002 Farm Bill is largely a return to pre-1996 policies and is expected to boost budgetary expenditure for agriculture by *USD 80 billion over 2003-12*. The Farm Bill reinforces incentives to increase output and to keep sensitive wetlands, such as those feeding the Florida Everglades, under production.

Funding for *agri-environmental measures* can be seen in a positive light. It remained at around USD 1.9 billion per year under the 1990s, but increased to reach USD 3.0 billion in 2004 (Table 3.3). As a share of total budgetary payments, agri-environmental payments increased from 5% in 2000 to 10% in 2004. Although output-related support payments (e.g. marketing loans) can be harmful in causing overproduction, payments provided through the Environmental Quality Incentives Program and Conservation Reserve Program are expected to yield environmental benefits. It is important nonetheless to restore the longer-term impetus towards decreasing production-related subsidies so as to reduce economic distortions and improve environmental outcomes. For example, irrigation water subsidies in the West amount to some USD 300 million per year in public funds. Eliminating them would

help conserve water and thus reduce pressure on biodiversity in the overdrawn Colorado basin. The US seems to have *no overall, coherent policy on the introduction or elimination of subsidies*, a matter left to sector negotiations and piecemeal political processes.

The US ranks third among OECD countries (after Japan and Greece) for subsidies to marine capture *fishing*. Total government financial transfers (direct payments plus transfers to reduce operating costs and provision of general service support) to this sector increased by 33% to USD 1.12 billion between 1996 and 2002.

### *Environmentally related taxes*

*Fiscal instruments* are little used in the United States to internalise environmental costs or influence consumption choices that have environmental consequences. Overall revenue from environmentally related taxes remains modest: it was estimated at USD 95 billion in 2001 (less than 1% of GDP), including taxes on energy products, motor vehicles, waste management and ozone-depleting substances.

*Fuel taxes are relatively low* in the US in general, and taxes on diesel and petrol for motor vehicles are the lowest in the OECD (Figure 5.2). Fuel taxes are considered a user fee that supports transport infrastructure services. A recent report on energy options by the Department of Energy's Interlaboratory Working Group concluded that a package of policies, including higher energy prices, could reduce US energy use and still generate a positive return on investment (i.e. benefits would exceed costs). The package also included auctioning of carbon permits, the effect of which would be similar to a tax on fossil fuel.

As in other OECD countries, several taxes related to *vehicle use* are applied, but few are linked to the level of environmental pressure related to vehicle operation. This lack, coupled with the very low fuel prices, means there is little incentive to take account of environmental concerns in transport choices.

### *Agriculture*

Agriculture's share of GDP was 1.6% in 2004, but the sector has a *disproportionately large impact* on the environment through land use, water pollution and use, and air emissions, notably of methane (Figure 5.3). Its relative significance has increased over time as non-agricultural point sources of pollution have been addressed (Chapter 3). Agriculture accounts for over 80% of loadings of total

suspended solids and over 90% of all pollution entering water from non-air sources. The *Clean Water Act* provides only for regulation of point sources and thus does not regulate non-point-source pollution from agriculture, though the EPA regulates intensive livestock operations as point sources, with states issuing permits for their waste discharges to water. The regulations and economic instruments applied to diffuse agricultural pollution need to be strengthened to correct significant environmental externalities. Such efforts should be co-ordinated with actions taken to reduce crop price support that encourages excess nutrient pollution.

In drier states, agriculture's impact in terms of *water use* is disproportionate to the economic benefit; for example, agriculture is estimated to consume some 80% of California's water supply but produce less than 2.5% of the state's income. California farmers pay a fraction of the full cost of the water used, and taxpayers make up the difference. This *cross-subsidisation* is economically inefficient and leads to overuse of water by agriculture. Moreover, a recent study suggests that more than 50% of irrigation water never reaches crops because of losses during pumping and transport. Below-cost water also encourages cultivation of water-intensive crops such as rice, cotton and alfalfa in arid areas. Despite progress, integration of environmental concerns in agricultural policy remains limited overall, and the changes to farm-support policy in 2002 undermined progress made earlier in the review period.

### *Economic instruments*

Progress was made during the review period in using economic instruments to implement environmental policy (Chapters 2 and 3). *Considerable scope* remains, however, for the introduction of economic instruments to improve integration of environmental concerns into policies related to natural resource management and consumption. *Pricing policies*, particularly in the energy and transport sectors, do not take environmental externalities sufficiently into account (Chapter 2). While the *polluter pays principle* is applied to recuperate costs of environmental regulation, with polluters paying the bulk of compliance costs in the US, polluters still lack incentives to take the full external costs of their activities into account in production and consumption decisions (Chapter 3). This is especially true for non-point pollution sources.

*User fees* are still rarely applied to recover costs of environmental services. Although some municipalities charge households in proportion to the volume of *waste collected* for disposal, most simply incorporate the average costs into local taxes, which does not create incentives to reduce or recycle waste. As metering has expanded, most urban households do pay monthly charges for *water supply* and waste water discharge, and thus have some incentive to rationalise consumption (Chapter 3). However, the bulk of capital investment in sewerage and waste water treatment capacity is still financed from general tax revenue rather than by users. Agricultural water users are cross-subsidised by other users in most states. Industries increasingly face *waste water disposal charges* if they discharge to municipal treatment plants.

Several *environmentally related taxes* are applied in the transport sector, though few are differentiated to create incentives to use less polluting vehicles or fuels. Energy prices remain among the lowest in the OECD, reflecting low taxation (Table 2.5). The use of a gradually rising tax on CFCs accompanied their successful phase-out and raised some USD 2.9 billion in its first five years of application (Chapter 8).

Ten states use *deposit-refund systems* on beverage containers to encourage *recycling*. Some states also apply similar programmes to encourage proper disposal of lead-acid batteries and of refrigerators.

*Targeted subsidies* are used to encourage certain production patterns, particularly in the agriculture and energy sectors. For example, agri-environmental payments encourage farmers to use management practices that reduce nutrient run-off or preserve bird habitats, and special purchase arrangements support electricity generation from renewable sources.

The US has been at the forefront of using *tradable permits* to control air emissions. Recent reviews of the cost-effectiveness of the Acid Rain Program, which established cap-and-trade systems for SO<sub>x</sub> and NO<sub>x</sub>, showed that its emission



reduction goals were met at lower costs than regulation would have entailed (Chapter 2). Tradable rights regimes have also been applied to water resource management in several states (Chapter 3), and transferable quota regimes for water effluent are in various stages of development for Long Island Sound, the Boise River, Chesapeake Bay and other locations. Trading has also been used to meet federal emission targets for ozone-depleting substances (Chapter 8).

*Comprehensive liability for natural resource damage* caused by oil and hazardous material spills has created strong incentives for pollution prevention in the shipping industry. An increased emphasis on third-party liability and criminal liability for environmental damage has strengthened the incentive for corporations to reduce the *risk of accidents* or land contamination with potentially costly environmental consequences. The many actions taken against polluters under *Superfund* legislation have helped finance remediation of contaminated sites (Box 5.3).

### *Voluntary initiatives and partnership approaches*

*Partnerships involving business and industry* often provide a needed framework for dealing with environmental problems not yet addressed by legislation (e.g. reducing GHG emissions, promoting the design and use of energy-efficient buildings, encouraging green chemical product design). They may also aim to give greater flexibility in meeting existing standards, and thus reduce compliance costs. The EPA and the Departments of Energy, Transportation and Agriculture are also involved in partnership programmes related to environmental performance. For example, the EPA and Department of Energy jointly administer an *eco-labelling regime* for appliances, which complements the EPA's own Green Buildings and Energy Star programmes.

Some programmes encourage business to *go beyond compliance* and become environmental leaders. The Business Round Table and the United States Council for International Business have actively promoted such partnership initiatives. From 1994 to 1998 the EPA's *Common Sense Initiative* worked with industrial sectors to develop more effective, lower-cost approaches to protect the environment and public health, and in some cases led to the development of new technologies or approaches (e.g. leak detection technology for refineries, a multimedia permit model for print shops). *Performance Track*, a voluntary programme initiated in 2000, encourages performance improvements that go beyond compliance, making recommendations based on site visits. More than 300 facilities of all sizes, and from all major industrial branches, participate. The EPA's voluntary programmes, collectively called *Partners for the Environment*, involve over 10 000 businesses and institutions in a wide range of programmes to achieve voluntary goals in water and energy conservation, GHG and toxic emission reductions, waste reuse and other areas. In return the EPA

provides incentives like public recognition and access to emerging information. The EPA continues to foster voluntary initiatives, such as the 2005 launch of the Resource Conservation Challenge, which focuses on sustainable materials management.

A number of programmes have been initiated to encourage *GHG emission reduction measures* in the absence of federal requirements in this area. Several of the Partners for the Environment programmes assist and reward voluntary actions to reduce *energy use*; among them are Energy Star, WasteWise, SmartWay Transport Partnership, Design for the Environment and Climate Leaders. SmartWay Transport, to take one example, is a partnership with road and rail freight haulers aiming to reduce *GHG emissions* through energy saving technologies, techniques and vehicles. The EPA estimates that it saved 769 trillion Btu of energy in 2000, resulting in avoided emissions totalling 37 million tonnes of carbon equivalent (Chapter 2). In 2005, an executive order advanced *co-operative conservation* as a means of drawing increasingly on partnership networks in achieving environmental conservation goals (Chapter 4).

Voluntary approaches have become *more prominent in the policy mix* in recent years. Many studies have shown that for such programmes to be effective they must be accompanied by *monitoring mechanisms* to assure accountability and facilitate evaluation. Where monitoring is weak or absent, criticism and fear of *over-reliance on voluntary measures* often arise. Voluntary measures are an important component of the instrument mix but should not automatically be chosen over regulations or economic instruments when these would be more cost-effective. Partnership approaches can be a useful way to avoid litigation and protracted negotiations. Overall, the recent emphasis on voluntary initiatives has introduced desirable flexibility, but it also raises issues regarding transparency, public involvement and efficiency, which will need to be addressed to justify such measures' prominence in the policy package.

### Box 5.3 The Rocky Mountain Arsenal

The *Rocky Mountain Arsenal* was established in 1942 on about 70 km<sup>2</sup> in Commerce City, Colorado, 16 km north-east of Denver. During the Second World War the US Army produced mustard gas, napalm, white phosphorus and other weapons at the site. From 1946 to 1982, Shell Chemical leased part of the site for pesticide production. The Army also continued producing and processing chemical weapons there until 1969, and used the area to store obsolete munitions and chemicals. Waste generated at or transported to the arsenal was disposed of using practices widely accepted at the time, but in the mid-1950s it was discovered that waste from the site was contaminating groundwater and damaging nearby crops.

By the mid-1970s, *large-scale contamination* of the soil and water table had been documented and, in addition to the demilitarisation of stockpiled munitions, containment of off-site migration of contamination had become a priority. In 1974 the Army began taking interim measures to contain the pollution, including building and running groundwater treatment systems on and off the site. The scale, toxicity and complexity of the pollution problems were so great, however, that the situation continued to worsen despite these efforts. By 1984 the *environmental impact* of the arsenal operation and resulting waste streams had become so pronounced that all private and military operations were stopped. Dismantling of production facilities at the site was accelerated after 1997 to comply with the *international Chemical Weapons Convention*.

The arsenal was added to the EPA's National Priorities List for Superfund clean-up in 1987, and *extensive clean-up operations* have been undertaken. Production facilities have been dismantled, treatment of contaminated soil and waste has been initiated and 2.84 million cubic metres per year of groundwater is being treated. As clean-up efforts progressed it was noticed that the area had become a sort of wildlife refuge because of its isolation. Populations of 330 species, including deer, fox, coyote, eagle, owl and a variety of nesting birds, were documented at the site. In 1992 Congress passed the *Rocky Mountain Arsenal National Wildlife Refuge Act*, adding the site to the national refuge system.

Clean-up is scheduled to be completed in 2011, and the site's *conversion to a full-fledged wildlife refuge* is under way. In 2004 the Army transferred around 20 km<sup>2</sup> of the site to the Fish and Wildlife Service, marking the official establishment of the Rocky Mountain Arsenal National Wildlife Refuge. A further 3.7 km<sup>2</sup> along the western perimeter was sold to Commerce City, with proceeds from the sale used to build the visitors' centre. The refuge already provides public access to nearly 16 km of trails, along with wildlife viewing and environmental education activities. The Army and Shell have spent about USD 2.2 billion so far cleaning up the arsenal.

### 3. Nature as a “Pathway to Health”

Assuring access to nature and outdoor recreational areas, traditionally a minor theme in US environmental health policy, has recently gained in significance with the *growing awareness of the economic costs of a sedentary lifestyle*. In 2003 the CDC released data showing that some 65% of adults in the country were obese or significantly overweight. These conditions decrease quality of life and life expectancy, and increase morbidity. Studies estimates the number of fat-related deaths to be up to 300 000 per year, and the Office of the Surgeon General calculates that obesity and

overweight cost USD 117 billion annually (about 1% of GDP) in direct medical costs and indirect costs such as wages lost to illness. The *rate of obesity among children* tripled between 1980 and 2002, to nearly 15%. The rapidity of the increase suggests the importance of environmental factors.

The Strategic Plan for NIH Obesity Research (2003) emphasises identifying behavioural and *environmental approaches to prevent or treat obesity* through such factors as lifestyle changes. Dietary Guidelines for Americans, developed in 2000 by a panel of scientists for the USDA and HHS, recommend increased daily activity. The guidelines estimate that if only 10% of adults began walking regularly, USD 5.6 billion in annual health care costs associated with heart disease would be avoided. The panel recommended that adults get at least 30 minutes of physical exercise per day, and that children and teenagers get at least 60 minutes per day. Reportedly, only 10% of children exercise regularly. The CDC recommends *walking and bicycling* as two of the best forms of exercise. In New York City, where 43% of elementary school pupils are overweight or obese, schools plan to offer free YMCA memberships and more actively promote sports programmes. Since 1992, USD 2 billion has been provided to states, through federal highway funds, for the construction of pedestrian facilities, bicycle routes and shared-use paths that can be used for recreational purposes.

Declared policy objectives notwithstanding, promotion of *outdoor exercise and relaxation in nature areas* has to date been integrated into general health protection policies only in a piecemeal fashion, through a variety of disparate measures. One

example is the US Park Service's Rivers, Trails and Conservation Assistance Program, which works with community groups and local and state governments to conserve rivers, preserve open spaces and develop trails and green areas as "*pathways to health*". The "pathways" include urban promenades, trails along abandoned railroad rights-of-way, wildlife corridors, downtown riverfronts and regional water trails. Another effort promoting the *use of public lands to enhance physical and physiological health* involves a memorandum of understanding whereby the Department of the Interior, USDA, HHS and Army Corps of Engineers are collaborating to raise public awareness of the role and benefits of physical activity in maintaining good physical and mental health. The Federal Highway Administration sponsors annual National Trails Day on the first Saturday of June, along with trail conferences where public health issues and the benefits of recreation are discussed. The National Parks Service periodically sponsors *fee-free weekends* to encourage visits to national parks and other federal recreation areas. If eliminating entrance fees and increasing accessibility to nature areas proves a cost-effective means of contributing to overall public health, the approach should be broadened.

#### *2.4 Trade-environment integration and related issues*

The US trade policy agenda over the past decade has increasingly sought ways to *promote mutually supportive trade and environmental policies* without constraining economic growth. Going beyond the approach of negotiating separate side agreements on environment as a matter of law, as was the case with the North American Free Trade Agreement (NAFTA), the US now incorporates environmental provisions directly into free trade agreements (FTAs).

Among the core obligations included in the environment chapters of US FTAs, the parties commit to maintain high levels of environmental protection and strive to improve them; effectively enforce their environmental laws (enforceable through the FTA's dispute settlement mechanism); and not weaken their environmental protection regimes to encourage trade or investment. The US also signs environmental co-operation agreements and other arrangements with its FTA partners. These instruments provide a framework under which the US negotiates a joint programme of work that includes capacity-building assistance on matters such as environmental laws, regulations and rules, and their enforcement, to buttress partners' ability to *implement the FTAs in an environmentally sustainable manner*. Co-operation agreements have been concluded with Singapore, Jordan, Chile, Bahrain, Morocco and the parties to the Central American Free Trade Agreement. Work plans with Chile and Jordan are in place.

The United States has used FTAs to demonstrate that an improved commercial relationship can help promote stronger environmental policies on the part of its trading partners. The US views FTAs as an opportunity to make progress on environmental challenges facing trading partners. By including *core environmental obligations* as principal negotiating objectives in the body of each FTA, the US gives environmental issues a new and heightened visibility. This approach also promotes better co-ordination between trade and environment officials and helps them better understand the links between trade and environmental policies.

Many multilateral environmental agreements have trade-related provisions and potential *trade implications*. Notable examples include the Montreal Protocol, CITES (Box 8.4), several hazardous waste pacts (e.g. Basel, OECD, La Paz) and conventions on chemicals (e.g. OECD, Stockholm, Rotterdam). The US has sought ways to promote mutually supportive trade and environmental policies in the context of multilateral environmental agreements.

#### *Environmental reviews and trade agreements*

The United States has a long-standing commitment to a policy of conducting written *environmental reviews of major trade agreements*. This policy dates back to 1992 and began with a review of NAFTA. A 1999 executive order and a set of implementing guidelines in 2000, followed by the Trade Act of 2002, made the process more formal.

In the last five years the US has completed the *review process* for its FTAs with Jordan, Chile, Singapore, Australia and Morocco. It has also completed interim reviews for the Central American and Andean FTAs, and the FTAs with Panama, Bahrain and Oman. Work is under way on reviews of the WTO Doha Development Agenda, the Free Trade of the Americas Agreement and FTAs with Thailand, the United Arab Emirates and the Southern African Customs Union.

The *US Trade Representative* and the chairperson of the Council on Environmental Quality oversee the reviews, with substantial input and analysis from other agencies, including the EPA, DOI and Department of Commerce. The findings are made available to the public and discussed with the prospective parties to the instruments.

## Box 8.4 Trade in endangered species

The US has continued its *vigorous support of the 1972 Washington Convention on Trade in Endangered Species of Wild Flora and Fauna*, meeting its commitments through the 1973 Endangered Species Act and other legislation whose requirements often exceed those of CITES. Examples include the African Elephant Conservation Act, Bald and Golden Eagle Protection Act, Marine Mammal Protection Act and Migratory Bird Treaty Act. The US agencies responsible for enforcing CITES and the domestic legislation are the Fish and Wildlife Service in the Department of the Interior (DOI), Animal and Plant Health Inspection Service of the US Department of Agriculture (USDA) and the Department of Homeland Security's Customs and Border Protection Service, all supported by the Department of Justice. Each year hundreds of enforcement actions are taken against illegal traffickers and smugglers, often resulting in fines and prison sentences. The US continues to apply *trade sanctions* recommended by the Conference of the Parties against countries that fail to enforce CITES, including suspension of trade in CITES-listed species. The environmental provisions of recent FTAs (e.g. with Jordan, Singapore, Chile, Australia and Morocco), along with related environmental co-operation activities, provide further support for CITES. Many US environmental NGOs carry out public awareness campaigns and finance programmes overseas to protect endangered species, such as tigers, elephants and rhinoceros, and their habitats.

With respect to trade in *forest products*, following the 2002 World Summit on Sustainable Development (WSSD), the President announced an *initiative against illegal logging* that pledges the US to help developing countries combat illegal logging, corruption in the forest sector and sales (including for export) of illegally harvested timber products. USAID, which plays a lead role in implementing the initiative, is supporting a project in Indonesia's Kalimantan province to protect orang-utan habitat. Trade in neotropical big-leaf mahogany and South-east Asian ramin, for which the US is a major importer, has been subject to new permit requirements since CITES listed the species on Appendix II to ensure that any trade is legal and sustainable. NGOs filed a petition with the CEC in 1999 accusing the US government of failing to meet its responsibilities under the *Migratory Bird Treaty by permitting clear-cutting* by US forestry companies in ecologically rich and sensitive areas. Major US and European retailers of timber and timber products have made a public commitment to sell more timber that is *certified as environmentally sustainable*. The supply of certified timber is very limited, however, accounting for less than 5% of the tropical timber sold in the US. The US is working to improve capacity in producing countries to sustainably manage timber through multilateral efforts under CITES and the International Tropical Timber Organization, as well as through bilateral assistance.

Management of US *endangered species programmes*, including enforcement, has come under heavy pressure in recent years because of funding constraints in key federal agencies. With concern about homeland security, however, enforcement to reduce trade-related threats to endangered species may be reinforced through strengthening of inspections at US land, sea and air points of entry as part of anti-terrorism programmes.

### *Export credits*

In 2003 the 30 member countries of the OECD adopted a *Recommendation on Common Approaches on Environment and Officially Supported Export Credits*. Until 2000, when the US initiated the effort, the US Export-Import Bank was the only such institution required to undertake and publicise environmental reviews for infrastructure projects (e.g. dams, power plants, roads) benefiting from export credits. By 2003 practically all member countries had established environmental policies and review procedures closely following the OECD Recommendation, committing them to adhere to the environmental standards of the country in which a project is to be financed, or to the standards of relevant international bodies (e.g. World Bank, Asian Development Bank) if the latter are stronger.

## **2.5 Development assistance**

### *Overall assistance*

“*Advance sustainable development and global interest*” is the second of four strategic objectives in the first-ever joint State Department-USAID strategic plan, for 2004-09. Pursuit of this objective includes *bilateral* assistance, principally through USAID, and funding of multilateral programmes and institutions such as UNEP, the UNDP, the GEF, the Montreal Protocol Multilateral Fund and regional development banks. In 2004 net US *official development assistance (ODA)* amounted to USD 19 billion, some three-quarters of it provided bilaterally. The US private and non-profit sectors also provide substantial development assistance, including significant environmental components, through companies, foundations, universities, environmental NGOs, etc. US institutions provide 50-60% of total private transfers through the OECD Development Assistance Committee (DAC).

Concerning total ODA, the US is the *largest donor among OECD DAC members* in absolute terms, but *ranks 21st out of 22* in relative terms, providing aid amounting to 0.16% of gross national income in 2004, compared with the DAC average of 0.25% and the UN target of 0.70% (Figure 8.2). The US has never subscribed to the UN target, maintaining that such targets emphasise inputs rather than results. In the US view, ODA is just a small part of what is needed; it sees significantly greater financial resources for sustainable development coming from “unlocking” domestic capital through sound



policies, and harnessing trade, foreign direct investment and remittance flows. USAID disburses some 65% of total US ODA, the State Department and Treasury 13% each, USDA 2.5% and the Department of Defense 3.5%. The EPA plays a significant role as well, through technical and financial assistance in support of other agencies' activities and through its own bilateral agreements with developing countries.

In 2002 the President launched the *Millennium Challenge Account* initiative, linking US development assistance to countries' ability to demonstrate good governance, invest in their people and encourage economic liberalisation. Congress supported the initiative by authorising a Millennium Challenge Corporation to administer the account and providing USD 1 billion in funding for 2004 and USD 1.5 billion for 2005.

The President has requested USD 3 billion for 2006. In 2004 the first 16 countries were selected for funding: Armenia, Benin, Bolivia, Cape Verde, Georgia, Ghana, Honduras, Lesotho, Madagascar, Mali, Mongolia, Mozambique, Nicaragua, Senegal, Sri Lanka and Vanuatu.

#### *Environmental assistance*

The principal channel for US *bilateral* development assistance, USAID, provided just under USD 600 million in 2003 for environmental activities in developing and transition countries. This amount represented 8% of *USAID programme funds*, a percentage that has been fairly steady over the past decade. Other federal agencies (including the EPA, DOI and USDA) provide valuable assistance in the form of training, information sharing and other capacity-building resources. Environment-related USAID financial and technical assistance activities in Africa, Asia and Latin America emphasise biodiversity and natural resource management. Additional concerns in Asia and Latin America include clean water, sanitation, air pollution prevention and energy efficiency.

Programme descriptions, staffing levels and statements of priorities indicate that environmental assistance is a *lower priority for USAID* than it was a decade ago. The disbursement of limited funds among numerous countries and small projects calls into question their *long-term impact in participating countries*. In recent years USAID has worked to *sharpen the focus of its environmental activities* and to aggregate funding, partially through collaboration with multilateral institutions and in part through partnerships with private institutions. In the latter regard, USAID, the EPA, DOE and USDA have key roles in implementing US commitments to the *Partnerships for Sustainable Development* made in 2002 at the WSSD in Johannesburg (Box 8.5).

Concerning *climate change*, in 1998 USAID launched a *five year, USD 1 billion initiative* focusing on Brazil, India, Indonesia, Mexico, the Philippines, South Africa, Russia, Ukraine, Central America, Central Africa and Central Asia. The DOE and EPA also provided climate change assistance. Overall, 2.3% of US bilateral ODA went to climate-related activities in 1998-2000, compared to a DAC average of 7.2%.

*Biodiversity* is another US development assistance priority, involving funding, training and technology transfer to improve management of forests, grasslands, wetlands and coastal areas. The Foreign Assistance Act specifically directs USAID to include conservation of tropical forests and biodiversity as major development goals. Funding for biodiversity activities doubled over 1996-2002 to USD 126 million, mostly channelled through USAID. Under the Tropical Forest Conservation Act programme, by the end of 2004 USD 56 million of appropriated funds had been used for nine *debt reduction/debt swap agreements*.

In response to the 2001 *Doha Development Agenda* call for governments to assist with capacity building in developing countries to address trade-related issues, the US expanded its trade capacity-building programme, increasing funding to USD 752 million in 2003 (compared with USD 36.9 million in 1999). This reallocation of resources also facilitated capacity-building activities with bilateral and regional trade partners. While only a minor fraction is devoted to environmental activities, the programme is raising developing countries' ability to address issues at the trade-environment interface.